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The Open University

Doctorate in Education (EdD)

Teacher educators as agents of change?
A critical realist study of a group of
teacher educators in a Kenyan university

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Abstract

This study focuses on the professional identity of a group of teacher educators in a Kenyan university. In order to improve student outcomes in sub-Saharan Africa, the quality of teaching and therefore the quality of teacher education (TE) needs to improve. Policy aspirations across the region call for a greater focus on the teaching and learning of skills, attitudes and values, with many making specific reference to learner-centred education (LCE); teachers need to change their practice, which means that teacher educators need to change as well. The study concludes that these pedagogic changes require a public consensus around the nature of knowledge about teaching, alongside conscious efforts to create opportunities for collaboration amongst teacher educators.

The context for the study is the Teacher Education in sub Saharan Africa (TESSA) programme of activities, run by The Open University alongside African partners, designed to support improvements in teaching and in teacher education. At the heart of the programme is a bank of Open Educational Resources (OERs). Experience gathered over the last ten years, suggests that achieving pedagogic change in teacher education is challenging; many will mediate the OERs for teachers, but do not see them as being relevant to their own practice. This study set about to determine why this is the case.

Working within a critical realist framework, the perceived agency of five teacher educators was investigated, alongside the nature of the social structures in the institution in which they work and the way in which the structures interact to constrain and empower agency, with respect to pedagogic change.

Analysis of data from documents, observations and interviews revealed a number of disconnections between theory and practice, and led to the identification for two underlying 'causal mechanisms' concerning the nature of knowledge about teaching and the importance of collaborative spaces. TESSA is identified as a causal mechanism that has not been fully activated in this institution. This has highlighted ways in which we can work more effectively with this professional group. The study has also demonstrated that critical realism can provide a robust theoretical framework for small-scale qualitative research.

Key words: teacher education, learner-centred education, critical realism, professional identity, pedagogic change

Word Count: 62,437

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Glossary

AD	academic director
BEd	Bachelor of Education
BERA	British Educational Research Association
CCETM	Co-operative Class Experiment Teaching Method
CCM	Co-operative Concept Mapping
CPD	continuing professional development
CR	critical realism/realist
EFA	Education for All
FN	field notes
GMR	Global Monitoring Report
HIV AIDS	human immunodeficiency virus (Acquired Immune Deficiency Syndrome)
IT	information technology
KCPE	Kenya Certificate in Primary Education
KICD	Kenya Institute of Curriculum Development
LC	learner-centred
LCE	learner-centred education
MoE	Ministry of Education
MoHEST	Ministry of Higher Education, Science and Technology
MOOC	massive open online course
OER(s)	open educational resource(s)
OU	Open University
PCK	pedagogical content knowledge
PGCE	Post-Graduate Certificate in Education
PhD	Doctor of Philosophy
PI	professional identity
PISA	Programme for International Student Assessment
PTTC	Primary Teacher Training College
QA	quality assurance
RISE	Researching Improvements in Systems of Education
RQ	research question
SDGs	Sustainable Development Goals
SS	secondary science
SSA	sub-Saharan Africa
TE(s)	teacher educator(s)
TESSA	Teacher Education in Sub-Saharan Africa
TP	teaching practice
TTC	teacher-training college
UKFIET	United Kingdom Forum for International Education and Training
UNESCO	United Nations Educational, scientific and Cultural Organisation
UNICEF	United Nations Children's Fund (originally United Nations International Children's Emergency Fund)
USAID	United States Agency for International Development
ZEST	Zambian Education and School Training

1. An introduction to this study

1.1 Introduction

This study is about the professional identity of a group of teacher educators (TEs) in a Kenyan university, and the prospects for this professional group as ‘agents of change’. It is a small-scale qualitative study of the work of five lecturers drawing on interviews, observations and documents, to understand their practice.

Pre-service and in-service teacher education are crucially important in building a highly qualified and competent teaching force, capable of helping young people to help themselves (Griffin, 2012). The global discourse (e.g. EFA GMR team, 2013; Dembele & Miaro-II Be-Rammaj, 2003; UNESCO, 2011) calls for teachers’ pedagogic change in order to improve the quality of education, away from lecturing in which learners are seen as passive recipients of knowledge, to more active pedagogies which engage and challenge learners, and provide the opportunity to develop a range of skills. If teachers are to change, then teacher education has to change as well. Yet there remains a disconnect between the pedagogy being promoted in school, and the pedagogy of teacher education (O’Sullivan, 2010). Furthermore, Moon and Umar (2013, p234) suggest: ‘Within the teacher educator community there is, as we have observed, a resistance to change’.

Teacher education is complicated because the medium is the message; teachers and student teachers will learn as much from what is done as from what is said. The lack of modelling of the sort of active pedagogies that are being promoted is therefore problematic (Cochran-Smith, 2009; O’Sullivan, 2010) and is preventing TEs from having the sort of influence and impact that they could (Cochran-Smith, 2006).

Studies show that pedagogic change by teachers is demanding and takes a long time (e.g. Murphy & Wolfenden, 2013; O’Sullivan, 2004; Schweisfurth, 2011; Vavrus, 2009) and that, for sustainable change, teachers need access to ‘other communities of professionals to nurture and sustain their evolving practice’ (Murphy & Wolfenden, 2013, p271). Teacher education is of crucial importance, particularly across the developing world where many teachers are unqualified (Moon & Wolfenden, 2012). TEs, therefore, have an important role to play in providing the ongoing support that is necessary to achieve sustainable change. For that reason, much of the international education development work at the Open University (OU) (where I work) has positioned this group of professionals as potential agents of change.

This chapter introduces the study by describing my professional background, the context in which I work, the journey that led to this study, including my professional dilemma, and initial research questions. Finally, it sets out the structure of the thesis.

1.2 My professional background

I came to the Open University (OU) in 2005 as a part-time tutor on the Post-Graduate Certificate in Education (PGCE), while still working as a part-time teacher. My long-term ambition had always been to move into teacher education, and for many years I mentored student teachers from different institutions. In 2004, I had had the opportunity to study for a Masters in Education, and in 2009 I became a full-time TE after 20 years of teaching science in secondary schools in England. For six years, my substantive role was subject leader for science on the PGCE, and then course director. But I also developed an interest in international teacher education. My current professional role is the academic director of Teacher Education in Sub-Saharan Africa (TESSA) – an international development project run by the OU. This study is related to that role, but my personal history as a teacher and TE are highly relevant and have impacted on my research.

1.2.1 An introduction to TESSA

TESSA is not the focus of this study, but it provides the context. TESSA is a programme of activities designed to support teachers and TEs in developing more participatory approaches to teaching (Anamuah-Mensah, Banks, Moon, & Wolfenden, 2013; Moon, 2010; Wolfenden, 2008; Wolfenden, Umar, Aguti, & Amani, 2010). It was originally conceptualised as an emergency teacher training programme, for unqualified teachers. With huge numbers of unqualified teachers in schools today, an increased demand for education as a result of universal primary education, and a greater emphasis on the quality of the education available to children, TESSA remains as relevant today as it was when it was first conceived in 2005. At the heart of the programme is a resource bank: 75 units of work, published in 2008 as open educational resources (OERs) based on the primary-school curriculum, and versioned for different African countries by our partners, most of whom are based in universities and all of whom are involved with the pre-service and in-service training of teachers. The OERs describe activities for teachers to carry out in their classrooms and are underpinned by the belief that teachers will learn through participation in new practices, collaboration and reflection. The TESSA 'programme' now consists of different projects, in different countries, focusing on the use of the OERs as a vehicle for pedagogic change. It is co-ordinated by the OU working with partners to find ways of mediating the OERs, and currently has funding from the Allan and Nesta Ferguson Foundation.

Many African countries are currently revising, or have recently revised, the school curriculum (eg Kenya, Zambia, Ghana, and Uganda) to include the teaching of skills and values. Teacher educators are thus preparing teachers to teach in a way in which they have never been taught, and urgently need resources to support them in this endeavour. Under the current grant we have been working in Colleges of Education, and in schools to mediate the use of TESSA OER in the context of the new curricula, emphasising the need for teacher educators to model the teaching

approaches they are asking for, from their students. The more we can learn about this professional group, the more successful the activities of TESSA are likely to be.

TESSA is not a specific intervention, targeting a particular subject or skill. The OERs – which cover the whole of the primary school curriculum - are designed to open up possibilities for teachers, and the model of change is one of evolution and not revolution. The aim is to encourage small changes in practice that will elicit new responses from learners, which in turn will encourage teachers to try new approaches. Much of our work is with TEs, as they are in a position to mediate the OERs for significant numbers of pre-service and in-service teachers. We have found that there is a ‘contradiction between the stated aims of teacher educators in terms of what should be happening in schools and their own practice’ (Harber, 2012, p67). Through the provision of contextualised examples of classroom practice, and an explicit theoretical stance, the TESSA OERs have the potential to support changes in teacher-education practice.

1.3 The background to this study

My involvement with TESSA started in 2010 when I took on the co-ordination of TESSA secondary science (SS). The plan was to extend the TESSA approach to secondary level by producing 15 OERs to support secondary science teaching. Working with colleagues from the UK, Zambia, Kenya, Tanzania, Ghana and Uganda, I ran two writing workshops and co-ordinated the final production of the units, between 2010 and 2012. These new OERs were published online in 2013 and were designed to support science teachers and TEs in moving away from formal lecturing towards more active pedagogies that engage learners, at all levels of the system.

This was my first experience of co-ordinating an international project – and I took steps, from the beginning, to plan for implementation. Drawing on the literature around the implementation of change (Elmore, 1980; Fullan, 2001; May, 2013; May & Finch, 2009; Wedell, 2009) and interview data gathered during workshops, the focus of the implementation phase was ‘How are you going to use these materials in your own work?’ It was disappointing, therefore, to find during a visit to Tanzania and Kenya in 2015 that the answer to the question ‘How are TEs using TESSA secondary science OERs?’ was essentially: we tell people about TESSA (Stutchbury, 2016). As a result, some individuals (teachers and student teachers) had enthusiastically adopted new approaches, but there was no evidence that the OERs were institutionalised or were seen by TEs as being relevant to their own teaching. As part of my initial study, I interviewed Professor Bob Moon, the first TESSA Director, and he suggested that if he was to start the TESSA project knowing what he now knows, he would try to secure a greater commitment from the university partners, in particular, to integrate the TESSA OERs into their teacher-education programmes. Like others, he is of the view that teachers need to change, but has observed that many teacher educators do not see themselves as part of the solution.

1.3.1 My professional dilemma

Thus, in my role as TESSA academic director (AD), with joint responsibility for spending a substantial grant to improve teacher education in SSA, I am keen to find out more about the professional lives of TEs in an African university and to understand how they could be better supported in driving the sorts of changes in pedagogy advocated in policy documents (e.g. Ministry of Education, 2012), reports, (e.g. EFA GMR team, 2013) and the research literature (e.g. Schweisfurth, 2013).

Schweisfurth highlights the difficulties in bringing about pedagogic change (2011). In a review of 72 papers (from a range of global contexts) about promoting active classroom pedagogy, she concludes that 'the stories of unequivocal success in implementation are few and far between' (p430). She goes on to highlight the 'barriers' to implementation. However, as a result of my growing international experience in challenging contexts, I am not convinced that 'barriers' is a particularly helpful metaphor, rather that they are constructions used by actors to justify the non-implementation of policy. Checkland, Harrison, & Marshall (2007) found that non-implementation of policy in the field of health was an emergent property of underlying organisational realities, and could be modified if these realities were addressed. 'Barriers' therefore are external to the situation and thinking in this way has the danger of allowing actors to maintain their identity as hard-working individuals, laying the blame elsewhere. From this viewpoint, individuals become less important than the context and the underlying social relations which give rise to them. It became clear that it was the 'underlying realities' which are perhaps what need to be investigated. Thus, it is my work on TESSA SS and now as TESSA AD that has driven my interest in this problem; I wanted to understand more about the underlying social realities of life as a teacher educator in an African university, and how they perceive their professional identity. Through this study, I found out more about the professional lives of TEs and the contexts in which they work, which is informing my work as TESSA AD. A review of teacher education (Lunenberg, Dengerink, & Korthagen, 2014) draws on 137 papers, only two of which are from Africa; this study makes a contribution to our understanding of the roles, responsibilities and professional lives of this professional group in Kenya. Previous research in the TESSA programme focused on understanding the professional lives of female teachers in rural communities in SSA (Buckler, 2011), understanding how teachers engage with new forms of practice (Wolfenden & Buckler, 2013) and a study from Kenya which examined how two teachers were introduced to TESSA OERs and subsequently brokered them within their schools (Murphy & Wolfenden, 2013). This study contributes to an emerging body of knowledge about the conditions for supporting pedagogical change in SSA, and extends the focus from teachers to teacher educators. While I cannot claim generalisability based on one small-scale study, my findings make a contribution to better

understanding the key challenges facing teacher education, and makes recommendations about which aspects of the system could be changed to greatest effect.

1.3.2 Why Kenya as a location for the study?

Through my work on TESSA, I have made numerous contacts among TEs across the continent, but particularly in Kenya and Tanzania. My colleagues in Kenya have been involved in TESSA since its inception, taking part in the development and versioning of both primary and secondary OERs; they are open, friendly, and keen to share their experiences with the TESSA network. They acknowledge the difficulties they face and, during my evaluation visit in 2015, expressed an interest in taking part in this work. As a result, I was able to identify a group of five TEs, working on the BEd in secondary science education, to take part in the study. A significant contributing factor to this decision was the fact that English is the prevailing language in this university. My colleagues speak English to each other in the university, and in some cases, at home as well.

Thus, my professional dilemma arises from my current role as TESSA AD. The focus of this study is a group of university TEs in a Kenyan university and the challenges they face in adopting new pedagogic practices. I bring to the study experience as a teacher and as a TE, and a deep interest in social theory as a means of understanding how and why people act in the social world.

1.4 The study

My interest is in the underlying social realities that give rise to the perceived ‘barriers’ to change, and my over-arching questions for this study are:

What are the conditions that enable and constrain TEs in a Kenyan university in their work with student teachers?

How do these impact on their ability to implement changes in their practice?

I focused on their professional identity as a way of finding out about:

- why people behave in particular ways;
- how the context in which they are working affects what they can and cannot achieve;
- how their behaviour impacts on the context in which they are working.

I used a critical-realist perspective in order to investigate these questions. Critical realism (CR) is about looking for explanations (causal mechanisms) through a focus on what people are able to achieve (agency) in the social context in which they are operating (structures). It sees reality as being like an iceberg: most of reality (the iceberg) is invisible to the observer. The causal mechanisms exist below the surface, but give rise to ‘experiences’ and ‘events’, and are identified through a process of inference, based on the analysis of data collected within the context under investigation. CR combines a realist ontology with a relativistic epistemology, and is ‘theory-

driven' drawing on a variety of social theories in order to seek explanations for observed phenomena. It assumes 'judgemental rationality' which allows researchers to 'evaluate and compare the explanatory power of different theoretical explanations and, finally, to select theories which most accurately represent the 'domain of real' given our existing knowledge' (Hu, 2018, p130). The 'critical' in critical realism thus highlights the fact that researchers are required to be critical of the theories that they use and the explanations that they propose. The ultimate aim of CR research is to improve the world (Price and Martin, 2018) through increasing our understanding of underlying social phenomena, so in that respect the term 'critical' also has similar emancipatory implications as 'critical theory'. CR, and how I have interpreted its main tenets, are discussed in chapters 3 and 5. At the end of Chapter 3, I re-present the questions using the terminology of critical realism, and in Chapter 5 I use the tenets of CR to develop a methodology.

I have found just two studies that specifically take a critical realist perspective in the context of education – one which investigates the reasons why teacher absenteeism in Tanzania is so high (Tao, 2013), and one which explores teachers' responses to curriculum change in Scotland (Priestley, 2011a) but both Tikly (2015) and Cochran-Smith et al. (2014) argue for CR as a lens for studying learning and teacher education respectively. In order to design the research, I drew on the studies mentioned, and on others from various social-science disciplines (e.g. Davey, 2010; Davis, 2013; Fletcher, 2016; Bygstad, Munkvold, & Volkoff, 2016)

1.5 The structure of my thesis

Chapters 2–4 draw on various aspects of the literature to

- describe the context (Chapter 2);
- develop a theoretical framework (Chapter 3); and
- explore the ideas pertaining to teacher learning, learner-centred education (LCE) and pedagogic change that are relevant to this study (Chapter 4).

Chapter 5 explains how I built my methodology within a critical realist paradigm, the implications of my position as a TE working with professional colleagues from another culture, the ethical issues that have arisen and how I have addressed them, how I have ensured the quality of the research and my approach to data analysis.

Chapter 6 presents my findings – what I believe I have found out about the situation I am studying.

Chapter 7 explores the implications of what I have found out about the prospect for pedagogic change driven by TEs in relation to the literature.

Chapter 8 summarises my contribution to knowledge, the wider implications of my findings and opportunities for further research. It critically reviews the use of CR as a paradigm for small-scale qualitative studies of this type and explains the implications for my professional practice.

2. The context for the study

This study took place in a university department of education in Kenya, in the context of training secondary science teachers. The focus was their work with pre-service teachers, but all of them are also involved in up-grade programmes for in-service teachers. In this chapter, I explain: the background to recent policy developments in education in Kenya, how education is organised, how teacher education is organised, the Government's assessment of what needs to change, and the aspects of the draft policy framework that are relevant to this study

2.1 Background

In 2007–8 following presidential elections, ethnic violence broke out in Kenya, killing 1,300 people and displacing around 600,000 (Brownsell, 2013). After interventions from the international community, stability was reached in March 2008, and it was agreed to establish a new constitution. This resulted in the publication of 'Unlocking the Future Potential for Kenya: The Vision 2030' (Ndung'u, Thugge, & Otieno, 2009), which set out three pillars - economic, social and political – through which to achieve the transformation of Kenya into 'a newly industrialised middle-income country providing a high quality of life to all its citizens by 2030' (p6). Education is a key aspect of the social pillar, and the aspiration is to create an inclusive system with a relevant curriculum which fosters social responsibility, enhances moral and ethical values, and increases literacy. This resulted in a more detailed draft policy framework (Ministry of Education (MoE) and Ministry of Higher Education, Science, Technology, (MoHEST) 2012) for educational reform. This was still under consideration when I undertook my fieldwork, but subsequently the framework has been finalised and a new school curriculum is under development.

2.2 Education in Kenya

The working lives of the participants in this study are strongly influenced by what is happening in secondary schools. Education in Kenya in 2016 was organised in what is termed an '8-4-4' system: eight years of primary education followed by four of secondary and four of tertiary (MoHEST, 2014). At the end of the primary phase, students sat the Kenya Certificate in Primary Education (KCPE), a high-stakes examination testing the recall of knowledge across eight subjects (O'Milligan, 2017)¹. Primary education has been free since 2003, and secondary education since 2008.

Educational outcomes remain poor. For example, fewer than 19% of class 2 pupils were reading at the expected fluency and comprehension levels in 2012, and only 14% of the population expected to complete secondary school (MoEST, 2014). There has been a rapid expansion in secondary

¹ In 2018, a new 'competency-based' curriculum was introduced and the nature of the KCPE, changed.

provision, with 2,678 schools in 1999 and 7,308 by 2011. The transfer rate to secondary school is around 70% (slightly different values are given in the various policy documents). Likewise, there has been a rapid rise in the number of students admitted to university – a policy which is impacting directly on my participants. The pupil–teacher ratio is 1:52 in primary and 1:32 in secondary. The aspiration is to achieve 1:40 in primary, but, to do that, 5,000 more teachers are needed (ibid.)

There remain many problems at secondary level, including an unfriendly environment, teacher absenteeism, household poverty (impacting on student attendance), HIV AIDS and a rising repetition rate (MoE and MoHEST, 2012). The ‘Education for all (EFA) 2015 National Review’ (MoHEST, 2014) states that Kenya outperforms 15 sub-Saharan African countries. This is consistent with a World Bank report (Bold et al., 2017) in which Kenya generally does better than Mozambique, Senegal, Nigeria, Togo, Uganda and Tanzania. Overall, my interpretation of these documents is that education in Kenya is probably best described as one of the ‘best of the worst’ performers worldwide. The Government intend to tackle this through the introduction of a new ‘competency-based’ curriculum (the current curriculum has been in place since 2002) and are investing heavily in IT infrastructure. At the time of the research (2016), the new curriculum was promised but had not been published.

2.3 Teacher education in Kenya

Teacher-training takes place in colleges of education and in universities. At primary level, teachers require a teaching certificate (a two-year course); and at secondary level, a diploma (a three-year course). The universities run BEd courses (four years) for prospective primary and secondary teachers, and many of those completing a degree teach for a few years and then move to the Primary Teacher Training Colleges (PTTCs). There are 22 Government-run PTTCs and 97 private institutions. In 2013, there was a dramatic increase in the number of graduates (from 6,865 to 19,273), but they still only represent about 10% of all teachers across both sectors (MoE and MoHEST, 2014). This university is therefore training some of the most highly qualified teachers in Kenya.

There are many unqualified teachers in the system, who undertake ‘upgrading’ distance-learning courses, attending face-to-face lectures during the school holidays. My participants therefore teach pre-service teachers during term-time, and in-service teachers in the school holidays. There are teacher shortages in Kenya, particularly in rural areas, but the situation is better than in many African countries.

2.4 The policy context for this study

At the time of this study, new policies were emerging and a new school curriculum was under development. The strategic priorities of the Government had been set out in a number of documents. These documents set out a direction of travel urging pedagogic change, and make significant criticism of the quality of teacher education (MoE and MoHEST, 2012, 2014, 2015; MoEST, 2014; Ndung'u et al., 2009).

Teacher education in Kenya is acknowledged to have 'questionable impact' (MoE and MoHEST, 2012, p61), with a lack of continuing professional development (CPD) and career development for TEs, and there is a suggestion that courses should place more emphasis on practice (p63). At secondary level, TEs are said to lack experience of secondary-school teaching, and there is an aspiration that the teacher-education curriculum should be more closely aligned to the school curriculum. However, one of the perceived challenges for policy-makers is that universities enjoy autonomy and largely set their own curriculum (MoE and MoHEST, 2012).

This assessment of the quality of teacher education is consistent with that provided in an independent study of teacher education in Tanzania, Kenya and Uganda, funded by the Department for International Development (DFID) and UNICEF (Hardman, Ackers, Abrishamian, & O'Sullivan, M., 2011), which highlights the need for more coherence between pre-service and in-service teacher education, capacity-building within the system, and more effective monitoring and evaluation of the quality of the training provided. The policy statement (2012) calls for greater regulation of, and accountability in, teacher education with quality-assurance procedures which reflect emerging trends. It also highlights the need to expand the university sector in general, encouraging them to produce more PhD graduates and strengthen their research (p104).

The EFA 2015 National Review (MoEST, 2014) identifies the key priorities as: 'the enhancement of learner outcomes through addressing issues related to quality including, introduction of a more relevant curriculum, enhancement of early grade literacy and numeracy, use of assessments and enhancement of teachers' pedagogical skills' (p19).

Hence, for the last six years, TEs in Kenya have been operating in a policy environment in which pedagogic change has had a high profile.

In a study of the current provision for teacher education in Kenya (Katitia, 2015) it is suggested that there is insufficient emphasis on pedagogical content knowledge (Shulman, 1986) and practical teaching experience, with too much emphasis on examinations which largely test the recall of knowledge. Student teachers are not encouraged to be reflective, and are assessed according to the lesson objectives in the lesson plan, rather than on what has been learned in the lesson (Katitia, 2015). The reform of teacher education in Kenya is part of the agenda (KICD, 2016)

but the current proposals lack detail, and the pace of change is slow. Part of the problem is perhaps that the body advocating reform – the Kenya Institute of Curriculum Development (KICD) – has no jurisdiction over the universities.

The new policy will bring changes in the school curriculum, and these will impact on TEs in Kenya, including my participants. . The sort of changes anticipated are congruent with the global discourse, and with the ideas and practices embedded in the TESSA OERs.

The draft policy framework indicates that the government does not lack ambition. It acknowledges the importance of a ‘learner-centred curriculum and responsive learning systems and materials’ (MoE and MoHEST, 2012, p26). This is reinforced later with a reference to the ‘need to improve teaching and learning processes in the schools’ (p61). There is also reference to the importance of developing different sorts of relationships, including ‘the development of teachers with a different mind-set’ (p45) and the acknowledgement that ‘the hardest element to change and the major challenge facing the profession concerns the changing instructional practices towards greater collaborative relationships between teachers and learners’ (p61). What is meant by learner-centred education will be examined in more detail in Chapter 4, and the policy documents will be analysed in terms of these ideas in order to define more critically the policy environment which underpins this study.

2.5 The university

The university is a long-established institution in rural Kenya, with a good reputation. Several people to whom I spoke expressed pride in the quality of the students and the fact that they are highly employable. The BEd in secondary science education was established 30 years ago, and during that time there has been considerable expansion in the provision for teacher education, with primary face-to-face and distance learning courses as well.

The pleasant working environment means that there is a relatively stable staff, with most of my participants having worked there for ten years or more. As academics, they are held in greater esteem than teachers; they are relatively well paid and have permanent jobs and nice homes. The university is seeking to develop its reputation for research and publishes a journal. This provides members of staff and students with the opportunity to publish masters and doctoral studies. Staff are under considerable pressure to publish research, which impacts on my participants.

The department runs three BEd programmes (Primary, Secondary Arts and Secondary Science); and compared to other programmes in Africa with which I am familiar, the BEd in secondary science has two distinctive features:

- There is a significant practical component, with students undertaking a whole term of teaching practice (TP). The supervision of TP is taken very seriously, with staff often travelling extensively in order to visit students some way from the university.
- Students are taught the subject content of the BEd in Science Education in the Science department alongside students of Physics, Chemistry and Biology. However, my participants identify strongly as scientists themselves and bring their subject knowledge into their teaching of methodology.

Within the university, this department is considered to have pedagogical expertise and has established a course for new academics across the university on how to teach. Several people told me about this course, but it has not run for the last four years owing to the pressures my colleagues are experiencing, arising from a rapid expansion in the university sector.

2.6 Summary

The university in which this study took place has a good reputation nationally and, it could be regarded as representing the 'elite' in teacher education (the vast majority of teachers are trained in colleges of education, to certificate and diploma level) and not, therefore, typically representative of the sector. However, given that lecturers are highly qualified and have access to international partnerships, it could be argued that they have the opportunity to become 'trail-blazers', supporting the development of teacher education into a profession that is taken seriously, and leading the implementation of government policy by operationalising learner-centred pedagogy and supporting others in doing so as well.

Given the difficulties in teacher education described in section 2.3 (and repeated across Africa), Moon (2010) argues for large-scale structural reform of teacher education, with school-based opportunities for certificated teacher learning forming the basis of a system that trains significantly increased numbers of teachers to meet the demand for qualified teachers in SSA. However, there is much that can be done within existing systems, and the purpose of this study is to better understand the link between what TEs are able to do (agency) in the context in which they work (structure), in order to support those with whom we are working in TESSA, to embrace more active approaches to teaching and, at the same time, re-evaluate their attitudes to learners and learning, and hence achieve the pedagogic changes called for by the Government. The link between agency and structure is at the heart of CR; and, as I explain in the next chapter, it was CR that provided the ontological and epistemological framework for the study.

3. Building a theoretical framework

Any research in social settings needs to be underpinned by an explicit account of what counts as knowledge (an ontology) and a framework for thinking about knowledge (an epistemology) (Guba & Lincoln, 1994). The framework for this study is provided by critical realism (CR), which focuses on the relationship between ‘agency’ and ‘structure’. In this chapter I set out my theoretical framework for the study, explain how I am interpreting ‘agency’ and ‘structure’ in the context of teacher education, and explain how these relate to a key theoretical concept in the field of teacher education: professional identity. Finally I re-present my research questions in critical-realist terms.

3.1 Introducing a theoretical framework

CR provides a way of thinking about the world which draws on social theory in order to seek explanations for social phenomena, alongside analytical tools to support data collection and data analysis. CR combines a realist ontology (there is something real to find out about) with a relativistic epistemology (different people will come to know different things in different ways). As I came to understand more about CR, I realised that it describes the way in which I think about the world and, during the course of my study, a set of philosophical ideas (e.g. Archer, 1998b; Bhaskar, 1998; Scott, 2010) began to seem like common sense. The main advantage for me, is that CR goes beyond rich descriptions in order to seek explanations and recognises the fact that, in the complexity of everyday life, those explanations may draw on different social theories (Tikly, 2015). Scott (2010) suggests that ‘though the philosophy of critical realism is well developed, its application to the collection and analysis of data at an empirical level is manifestly under-developed’ (p9). This study attempts to demonstrate how the concepts that underpin CR can provide an explanatory framework in the context of a small-scale qualitative study in an educational context.

3.1.1 An introduction to critical realism

CR assumes the existence of independent structures (or social forms) that constrain and enable actors to pursue certain actions in a particular setting (agency) (Tao, 2016). In the context of this study, the relevant structures are those which will impact on the ability of TEs to bring about pedagogic change. Critical realists use the concept of ‘agency’ to embrace the capacity of individuals to act, and recognise that individuals will be working in institutions, where they can be both constrained and supported by various social forms or, in CR terms, ‘structures’.

Understanding the relationship between structure and agency is at the heart of any research in a CR paradigm (Archer, 1998b; Bhaskar, 1998; Scott, 2010).

‘Independent’ implies structures that exist beyond our knowledge of them. However, knowledge of these structures will be subjective, relative and constructed by individuals; the nature of the reality cannot be unproblematically understood, characterised or measured (Wynn & Williams, 2012). The tenet, therefore, is that a social reality exists which is independent of our knowledge of it (Tikly, 2015). This reality is stratified, differentiated, structured and changing. It can be regarded as consisting of two domains: the transitive (things that we can know about) and the intransitive (things that we can’t know about, but through research can seek to find out about and to explain). In summary, the aim of research within a critical realist paradigm is to seek explanations for observed experiences and phenomena in the social world (such as the uptake or not of a set of ideas or practices), by exploring the relationship between structure and agency. It draws on social theory to identify underlying causal mechanisms that give rise to observed events, but requires the researcher to be critical of the theories they use. In this way, research in a critical realist paradigm can contribute to social theory.

On-going contemporary academic discussions (Whelan, 2019) suggest that critical realism has drawn upon critical theory to inform the way being “critical’ is understood and utilised. In both traditions, critique is a central and active part of the research process and the ultimate aim of research is to go beyond highlighting trends and common-sense explanations, to look beneath the surface of the social world in order to offer alternative understandings and bring about change. Critical realism does this through a focus on structure and agency, whereas critical theorists focus on the underlying ideology. The term ‘critical’ ensures the analysis goes beyond the technical approaches of a purely realist perspective (Porter, 2015).

3.1.2 Structure and agency

In his development of CR, Bhaskar (1994) explained the relationship between structure and agency as follows (*italics in the original text*):

‘...all social life is embodied in a network of human relations. This may be demonstrated by the mental experiment of subtracting from society the human agency required for it to be an ongoing affair. What we are left with are *dual points of articulation* of structure and agency, which are differentiated and processually changing *positioned practices* human agents occupied, engaged, reproduced or transformed, defining the (changing) system of social relations in which human praxis is embedded. Here again, on the relational model we have a figure of a duality-with-a hiatus, preventing reductionist collapse in either direction.’ (p93)

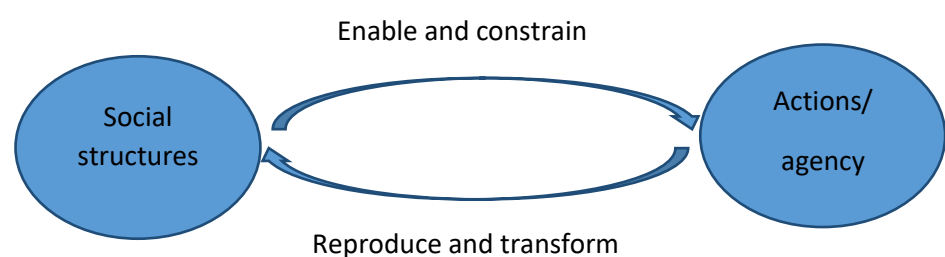
Put more simply, he is suggesting that we can treat structure and agency separately, while recognising that they are intimately connected.

Bhaskar was a philosopher, but his ideas have been adopted and interpreted by sociologists so that they can be used to explain social phenomena. Archer (1995) argues for ‘analytical dualism’ and makes two propositions: that ‘structure necessarily predates the actions which transform it’ and that ‘structural elaborations necessarily post-date those actions’ (1998c, p202). She defines a ‘morphogenetic approach’, by which she means we can investigate how the shape of society emerges (morphs) from agents and the intended and unintended consequences of their actions. In practical terms, studying what people do and why they do it will reveal social structures, and in turn, understanding the social structures will explain why they can and cannot do certain things. CR thus seeks separate accounts of structure and praxis, but recognises that it is the interplay between them that leads to greater understandings (Archer, 1998b).

CR sees structure and agency as dialectic and giving rise to emergent properties that are not reducible to the sum of their parts (Tikly, 2015). Emergence is a key concept in CR. Interactions between agents, between structures and between agents and structures can give rise to new phenomena which cannot be reduced to the components from which they arise. In social situations, these can sometimes be considered to be the unintended consequences of an action or a set of actions.

The properties of a given ‘structure’ (such as a university department of education) will emerge from interactions between sub-structures (social forms), between agents, and between structures and agents. The realist perspective thus provides an analytical framework for studying social situations (see Figure 3.1).

Figure 3.1 The relationship between structure and agency



Critical realists assume that social structures exist independently of actions, but that these structures enable and constrain actions, which in turn reproduce and transform social structures. (Some accounts of CR separate ‘culture’ from structure and agency (Archer, 1998a), but as I explain in section 3.4 (below), I take a different view).

CR represents a particular worldview, which has been used as a basis for research in several different fields within social science such as management, health and information technology (e.g. Bygstad et al., 2016; Davis, 2013; Easton, 2010; Fletcher, 2016; O’Mahoney and Marks, 2014;

Wynn and Williams, 2012). It is gradually gaining support in the field of educational research (Cochran-Smith et al., 2014; Priestley, 2011b; Tao, 2016; Tikly, 2015).

This theoretical framework provides an analytical lens through which to study 'structure' and 'agency'. Before explaining how I see 'structure' and 'agency' in this study, I summarise why I chose CR.

3.1.3 Why critical realism?

There are several reasons why this way of thinking about the world is appropriate for this study. Firstly, I am looking for explanations (what are the conditions which support pedagogic change in teacher education?); and for an understanding that goes beyond rich descriptions (Tikly, 2015). I am keen to understand the work of university TEs in this context and the pressures they face. CR accepts emancipation as part of the research process; and, by providing an account of the generative mechanisms that give rise to certain events and institutions, CR is simultaneously engaged in a critique of their role in, and influence on, social action. Asking 'why' questions in social science implies that there is 'something' to find out about. By acknowledging the possible existence of a 'social reality', CR enables us to go further than interpretative approaches and seek explanations. This relativistic epistemology, and the requirement to be critical in the use of social theory, ensures that positivist claims are not made and that explanations within this paradigm are process-orientated rather than variable-orientated (Maxwell and Millapalli, 2007).

Secondly, CR recognises the contribution that social theory can make to understanding social situations and explaining events (Maxwell and Millapalli, 2007; Scott, 2010; Tikly, 2015), but is critical of those theories, providing the opportunity to deepen understanding in a field where 'theory' cannot be treated in the same way as scientific theories. Social theories attempt to explain how the social world operates (Turner, 2013) and are based on the assumption that the social universe reveals certain basic fundamental properties and processes that can explain the flow of events in specific contexts. Tikly (2015) argues that interpretivism places too much emphasis on inductive methods and therefore does not use theory to build knowledge about social settings. He suggests that learning is a good example of a phenomenon that could be investigated using a critical realist perspective. Interpretivists emphasise social and cultural forms of learning, but he suggests that learning is highly complex and that in some circumstances, in some contexts, individual, cognitive and biological theories can provide insights. CR acknowledges the role of social theory in social research, but also acknowledges its limitations; this enables researchers to draw on theories appropriate to the situation under investigation. In my scholarship work in the field of international development, I have explored various theories in an attempt to understand what we do and how we might do it better. These include theories of

learning (Lave & Wenger, 1991; Vygotsky, 1978); theories of social action (e.g. Checkland & Casar, 1986; Vickers, 1965); and theories of implementation (e.g. Elmore, 1980; May, 2013; May & Finch, 2009). I have come to realise that in the messiness of real life, various social theories can offer insights into different aspects of the situation. CR offers a holistic perspective and the opportunity to draw on different theories to explain different aspects of the situation. It recognises the fallibility of theories and encourages us to critically examine the theories we choose to use. In this way, it has the potential to contribute to social theory.

Thirdly, the CR perspective recognises the central importance of context (Maxwell & Millapalli, 2007). Having worked as a teacher and a TE in many different settings, this is consistent with my own worldview and my own experience. Causal explanations won't simply vary across contexts; rather, the context is intrinsically involved in the causal processes. The phenomena (events) that I am trying to explain depend on causal mechanisms available in the prevailing social structures, and these depend on changing contextual conditions (Wynn & Williams, 2012). My experience suggests that understanding the causal explanations and mechanisms at work in this university department, while not being necessarily transferable to a new context, would provide insights into how similar mechanisms might operate in other universities, and hence suggest what questions to ask, or avenues to follow.

Fourthly, the concept of emergence – the recognition that social phenomena cannot be reduced to the sum of the parts – is particularly helpful. Cochran-Smith et al. (2014) advocate for CR as a platform for research in teacher education, as it provides a way of thinking about aspects of teacher education that emerge from the complex interaction of the policy environment, teacher-education institutions, schools and individual classrooms. CR recognises that what we observe will be the product of contingent causal mechanisms that are not necessarily directly accessible to us. In these circumstances, individuals' reasons and meanings are treated as part of the real world; beliefs, perceptions and interpretations can be studied as part of causal mechanisms. Tao (2016) makes a link with the Capability Approach, arguing that a person's 'essence', or what she or he is disposed to do or become, is a causal mechanism.

Finally, ontologically, CR proposes the existence of a stratified depth reality (Fletcher, 2016). This means that reality is considered to be like an iceberg – we can observe some of it, but there is a great deal going on beneath the surface that we can't know about. The tenet is that observable events arise as a result of activities within social structures – structures that are constantly changing as a result of those activities. These activities are going on beneath the surface but can be accessed through research. I have found that this provides a structured way of thinking about the disconnections that arise in teacher education, in particular the mismatch between theory and practice.

Critical realists think in terms of three relatively autonomous levels of depth reality: the empirical level (the experiences and sensed perceptions of knowing subjects), the actual level (objects and events that occur in the real world) and the real level (deeper-lying structures and causal mechanisms) (Fletcher, 2016; Scott, 2005; Tikly, 2015). The empirical level can be seen and/or measured (the visible part of the iceberg); the actual level can be investigated relatively easily through qualitative research methods (just below the surface); and the real level (the bottom of the iceberg) has to be inferred through a process of abduction (theoretical re-description) and retrodution (a focus on causal mechanisms). Contradictions arise in the 'actual' level of reality, which, as I will demonstrate, can be better understood by investigating the 'real' level of reality. Abduction involves taking a set of observations and looking for a plausible interpretations or explanations. Retrodution involves testing the proposed explanations against the evidence in order to identify the causal mechanisms (i.e. what it is about the situation which is giving rise to the observed phenomena). The purpose of critical realist research is to determine which causal mechanisms have been triggered in this situation, and what effect they are having. It also provides a way of thinking about what causal mechanisms have not been actualised and could be if things were different.

Having explained why this way of thinking about the world provides a suitable framework for my investigation, I will examine in more detail how I am interpreting agency and structure in the context of teacher education, and how one of the key theoretical concepts in teacher education – professional identity – fits into my theoretical framework.

3.2 'Agency' and 'structure' in the context of teacher education

At the heart of critical realism, is the relationship between 'agency' and 'structure' (see figure 3.1). Here, I explain how these terms are interpreted in the context of this study.

3.2.1 Agency

'Agency' – the capacity for individuals to act – is at the heart of this study. The willingness of my TE colleagues, all over Africa, to embrace the ideas set out in the TESSA OERs and Government policy documents depends on their motivation, commitment, professional knowledge and past experiences, but also on the extent to which they are constrained and supported by the various social forms ('structures'). This is consistent with Archer's message (quoted in Pawson, 2013), that social science 'should commence with an understanding of how people come to make choices, for their collective decision-making constitutes the underlying mechanism that generates all social outcomes' (p5). This study recognises that pedagogic change requires new patterns of behaviour, some of which may be problematic, as they require the investment of individuals in new ideas. It has been suggested that 'to be effective changes need to alter the constrained choices of individuals' (Pawson and Tilley, 1997, p216). However, although Pawson and Tilley come from a

realist perspective, but they do not acknowledge the understandings of change and transformation that are implicit in the *critical* realism of Bhaskar and Scott (Porter, 2015). In this study I shall be investigating how the 'constrained choices of individuals' interact with social structures to determine the possibility for pedagogic change.

Within CR, agency is a central concept. Bhaskar (1994) suggests that agency concerns the capacity of humans to transform situations and themselves through reflexivity. He suggests that human beings are characterised by a 'capacity for intentional agency and for reflexive awareness and organisation of such agency and by a thoroughly social existence' (Bhaskar, 1998, p411). Archer's theory of human agency (1995) places powerful people, capable of bringing about transformation, at its heart, and she argues that choices about how to behave are the result of reflexive deliberations on social situations. She argues that not everyone will be in a position to become agents or actors who can develop the sort of agential powers necessary to affect transformation. She defines 'agency' by reflexivity – capabilities that are developed as a consequence of reflexive deliberations on social situations.

In a critique of Archer, Elder-Vass (2007) asserts that we often perform actions that are intentional and meaningful, without necessarily being aware of the decision-making process; we may act without intensive prior deliberation. This is consistent with my own view that, although being human might mean that we have the capacity to be reflective and reflexive, it is not a necessary condition for acting purposefully. We can act effectively, yet instinctively, drawing on past experiences and tacit expertise in a subconscious manner. For example, in a vivid and authentic description of classroom teaching, McIntyre (2002) highlights the fact that teachers make many instantaneous, subconscious decisions in the course of a lesson, based on their professional instinct. This is consistent with other scholars who have studied social processes (Checkland & Casar, 1986; Checkland & Poulter, 2006; Vickers, 1968) in which the capacity to take purposeful action is seen as being fundamental to being human (rather than reflexivity), and 'choices' are seen to be the result of noticing, discriminating and judging – a process that might be instinctive and instantaneous, or the result of deliberation over an extended period of time (Checkland & Casar, 1986). I would argue therefore that 'agency' (choosing to act purposefully) does not necessarily have to be the result of measured prior deliberation (reflexivity), although of course it can be.

My experience of working in Africa over a period of six years is that people are not in the habit of examining their own practice or questioning the status quo – reflexivity and reflexive discourse is not common. Yet this does not mean that people are not 'agentive' in many different ways. For example, people often negotiate difficult political situations and manage to create opportunities for themselves. The challenge in the work that we do on international development projects is to

better understand the relationship between individual agency and social structures so that we can collaborate more effectively.

Bhaskar (1994, 1998) links human agency to a 'thoroughly social existence' (see above). This is consistent with alternative views of agency which focus on interaction, discourse and participation, rather than on individual reflexivity (Lave & Wenger, 1991; Lipponen & Kumpulainen, 2011). In this project, I see agency in broader terms than Archer and something which is not confined to powerful, reflexive people. I see it as 'the capacity to initiate purposeful action that implies will, autonomy, freedom and choice' (Lipponen & Kumpulainen, 2011, p812). Purposeful action may be the result of reflexive deliberation, but it can also be instinctive, based on judgements which draw on past experiences and personal standards (Vickers, 1965), or on relationships, social interactions and personal identity within a particular cultural context (Lave & Wenger, 1991). The implication of this is that understanding why people act as they do needs to take account of their past experiences; their values, beliefs, interests and agendas; the social situation in which they are working; and their sense of self (personal identity).

In this context, TEs may well be 'agentive' in that they 'get things done' (in line with departmental priorities) and are successful in pursuing their own agendas, but not necessarily in leading on developing new approaches to teaching and learning within the department in which they work. In a group of TEs, people will have different priorities and will be working towards their individual agendas (although there might be some shared agendas), yet I am approaching the situation with a particular lens: the adoption and modelling of more participatory approaches to learning. A department might include some advocates for pedagogic change in the form of more learner-centred practices, some who are aware of possibilities, and some who don't see any need for pedagogic change in their situation. Critical realists take the view that it is how the advocates are able to interact with the social structures which will determine whether they can exercise their agency with respect to pedagogic change.

3.2.2 Structures

The capacity to act is supported, or constrained, by 'structures' (Archer, 1995). Within CR, structures are considered to be 'real' because they have causal powers and emergent properties, although it is recognised that they only exist in relation to the people concerned. Archer (1995) suggests that it is 'possible to identify structures because of their irreducible character, autonomous influence and relatively enduring character' (p168). The properties emerge through interactions between components and, as the causal mechanisms are enacted, structures will change. Scott (2010) provides some guidance about what form 'structures' might take. He develops a typology of five types of structures (social forms) that could be interpreted as being part of a social situation and an individual's appreciative setting (how they see the world) (Vickers,

1965), and could influence how agents might act. Table 3.1 summarises these and indicates how they might be interpreted in the context of TEs working in a university, recognising that they are dynamic and will change over time.

Table 3.1: Scott's typology of structure (2010, adapted from p97)

Type of structure	Scott's description	What this might mean in this study
Embodied	Structures which keep people in one place and prevent them from moving to a different place. Resistance is possible, but only by removing the structure and effectively transforming the site of the activity to allow a different range of activities to take place.	The school curriculum or the curriculum of a teacher-education course could be interpreted as an embodied structure. The curriculum dictates much of the day-to-day activity in any educational setting. Some social norms may also be considered to be embodied structures, as they can restrain action.
Discursive	Structures that potentially effect change. Agents are confronted with ideational resources or structured discourses which act as a resource for their belief systems. They sustain the individual and may include stories, narratives, arguments and chronologies. They play a role in the construction and maintenance of structures of agency. These are psychosocial narrative forms which impact on intentionality. Individuals cannot create discursive structures, but they can contribute to them.	This is the framework of ideas that underpin agents' activities. In this case, it could be the ideas about knowledge, learning and teaching that underpin the national policy framework, course structures, examinations and the way TEs interact with students. It could also be ideas they have been exposed to in their role and in the past, including any exposure they have had to LCE or opportunities they have had to collaborate internationally. This is a structure in which contradictions can arise, which can empower or constrain agency.
Structures of agency	Structures that refer to the discursive and material affordances in the world which impact directly on the agency of the individual. They may influence the acquisition of capabilities (conscious or tacit). Structures of agency refer to the different forms the 'self' might take and are therefore linked to personal identity.	Individuals' identities will be built on past experiences, ideas they relate to, and relationships which have influenced them. All of these will have affected their confidence as a TE and their desire and ability (or otherwise) to challenge the status quo. They will bring to their role a worldview shaped by values, attitudes, interests, expectations and beliefs about teaching and learning. The juxta-positioning of differing worldviews will create a 'structure' which may impact on how individuals choose to act.
Institutional and systemic	These concern the relations between people that endure over time. Such structures are regulated either explicitly or tacitly through the norms, values and roles woven into the fabric of social discourses.	This refers to the social norms, values and roles of the institution in which the activity takes place. The relationships, the hierarchy, the norms and expectations of individuals that work in it – which behaviours are highly valued, which attract sanctions.
Social markers	These include gender, class or race, all of which can influence how actors are treated, their sense of identity, and the resources available to them.	Age, gender, background (social and ethnic), of the participant will impact on how they undertake their role as a TE.

The difference between Scott's typology and other interpretations of CR is that the ideas that underpin the activities of the actors are classified as 'discursive structures'. 'Discursive structures' are those which can affect collective change (Scott, 2010). They are the, often tacit, ideas and beliefs that underpin the work of the institution. Individuals will hold ideas and beliefs relevant to their work, but the premise underpinning the notion of discursive structures is that it is possible to identify a collective view of the world. In the context of teacher education, these will be ideas about knowledge, learning, learners and teaching, and they will be embodied in the course outlines, the way in which learning, and teaching are organised, and the resources made available. New curricula or new resources (such as TESSA OER) will also be underpinned by a set of ideas about learning and teaching. In this model implementing change involves accommodating new ideas within the prevailing discursive structures.

Scott's typology illustrates the inter-relatedness of structure and agency. It suggests that in studying the activities of TEs in this institution, I would need to consider the following dimensions:

- the curriculum;
- ideas about knowledge, learning and teaching that TEs have been exposed to and have experienced;
- their identify as TEs and their sense of 'self';
- the institution: how it is organised, the resources available and the relationships between those involved;
- age, gender and class of the TEs (agents) and how this impacts on how they behave.

These 'structures' are different sorts of phenomena, which reflects the messiness of real life and therefore gives credibility to the typology. Some are concrete (the curriculum, institutional hierarchies), some are abstract (ideas), and some are individual, referring to the social space in which different identities and worldviews are enacted and accommodated. The analysis of the data revealed the structures that are present in the situation under investigation. The intention was to treat this typology not as a description of the social forms that underpin a social situation, but rather as a sensitising device and a starting point for my investigation of the structures in this context relevant to the issue of supporting pedagogic change. As is explained in Chapter 5, I concluded during the analysis that causal mechanisms arising from 'structures of agency' and 'social markers' (individual structures) were problematic with respect to my position as an outsider, and I only considered evidence about discursive, embodied and institutional structures.

Two of the dimensions above (professional knowledge and identity as a TE) suggest an overlap with the concept of professional identity (PI). This is a key concept in teacher-education research (Davey, 2010; Loughran, 2011; Murray & Male, 2005), in which the tension for many TEs between

their past identity as a teacher and their identity as a university teacher and researcher is highlighted (Boyd & Harris, 2010; White, 2014; Williams & Ritter, 2010). Therefore a CR study in the field of teacher education should include an account of how the concept of PI fits into the theoretical framework. This helped to operationalise the framework for teacher education, supported the research design and informed the analysis framework, by highlighting the issues which needed consideration.

3.3 Professional identity

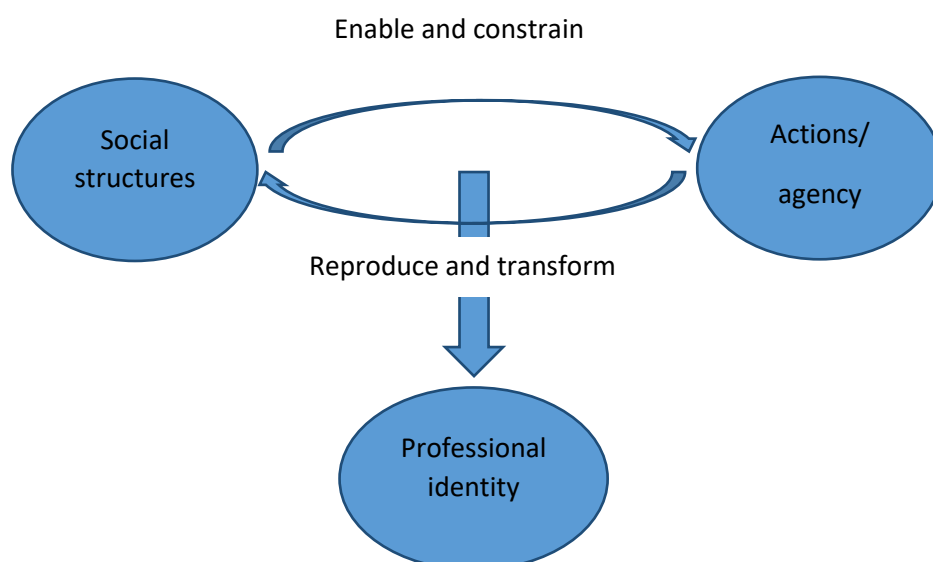
Within the CR paradigm, PI is considered to emerge as an individual exercises agency in a particular social setting, linked to a professional role, enabled and constrained by dynamic structures (Marks & O'Mahoney, 2014).

PI is complex, contestable, dynamic and cross-disciplinary (Davey, 2010). However, it is important:

Ultimately, the quality of teacher-education programmes is a reflection of the state of the hearts and minds of TEs and of their desire and ability to imagine their work in new and refreshing ways and then to take concerted action to realise their visions. (Dinkelman, 2011)

Having a clear sense of 'who they are' ('hearts and minds') and 'what they do' (how they 'imagine their work') is necessary to help TEs respond to the changing context in which they work (Davey, 2010). The focus of this study is the work of TEs – what they do, how they do it and why they do in that way – rather than PI per se. However, a working definition of PI in this context is necessary because of the links between PI, structure and agency. A sense of purpose and exercising some control over one's professional life (agency) are important aspects of PI (Boyd & Harris, 2010; Cochran-Smith, 2006; Davey, 2010; Swennen et al., 2010), as is the social and cultural environment (structures) in which they work (Davey, 2010). Investigating PI will provide access to an understanding of how TEs perceive their agency and the structures which support and constrain them. This is illustrated in Figure 3.3.

Figure 3.2 The relationship between structure, agency and PI



Investigating the PI of my participants provided insights into the link between structure and agency in this context.

3.3.1 Defining professional identity

How PI is defined in teacher-education research depends on the theoretical position being adopted by the researchers. There is no empirical research in the field of teacher education which adopts an explicitly critical realist perspective. However, drawing on other traditions, I will present a definition of PI which, I will argue, can be interpreted in terms of structure and agency.

A review of teacher-education research reveals three slightly different perspectives on PI – socio-cultural, psychological and poststructuralist. While this research is from the developed world, the findings are high-level and, I believe, applicable to the context of Kenya. The three perspectives overlap and their different emphases will now be considered.

A number of authors take a socio-cultural stance (Menter, 2011; Swennen et al., 2010; Williams & Ritter, 2010), in which identity is viewed as a relational phenomenon, mediated and developed through practice in particular social and cultural settings. For example, Swennen et al. (2010) see identity as ‘socially constructed self’ (p131), developed in the communities of practice. Wenger (1998) proposed five dimensions of identity that need to be taken into account, within this perspective (adapted from p149):

- Identity as negotiated experience. How do TEs work with others?
- Identity as community membership. How do TEs fit in to the community in which they work?
- Identity as learning trajectory. How does their current role relate to previous roles and experience?
- Identity as nexus of multi-membership. What sub-identities do TEs hold?
- Identity as a relation between the local and the global. What is the impact of the wider discourse and national policies on the TEs?

The psychological or developmental perspective focuses more on the ‘self’, with establishing identity being about developing internal mental models which bring together the ‘situational self’ (developed in interactions with others) and the ‘substantial self’ (self-defining beliefs) (Nias, 1989). This is the view of identity taken by Murray and Male (2005) in their conceptualisation of the journey from being a teacher to being a TE. They argue that the journey is stressful because the substantial self remains the same (‘I am really a teacher’) but the situational self has changed.

Finally, a number of studies in the field take a poststructuralist view of identity which emphasises the importance of political context, discursive practice and power in identity formation (White 2014; Dinkelman 2011). Both authors use the four dimensions from Gee (2000)- nature identity, institutional identity, discursive identity and affinity identity - to conceptualise the work of TEs in universities, and conclude that professional identity is best nurtured through involvement with a group of practitioners (affinity identity) and in dialogue with others (discursive identity).

Much of the discussion about TEs refers to 'professional identity', raising questions about what 'professional' might mean in this context. Murray (2014), acknowledging that it is a contested term, defines it as 'repertoires (or sets) of professional knowledge and values which articulate the character of teacher-educator practices' (p8). The existence of 'sub-identities' is also a feature of complex professional roles (Wenger 1998; Gee 2000). However, writing about researching identity within a CR paradigm, Marks and O'Mahoney (2014) suggest that CR provides the opportunity to distinguish between identity arising from the roles which people inhabit (professional identity) and the individual's own beliefs (personal identity).

In a study of the PIs of nine TEs, Davey (2010, adapted from p31) draws on different perspectives to suggest the following definition of PI:

1. PI can be thought of as both personal and social in origin and expression. This recognises that identity is perceived at a personal level, but is socially and culturally constructed.
2. PI can be thought of as multifaceted and fragmented, as well as evolving and shifting in nature (partly as a result of the impact of national and institutional politics).
3. PI involves emotional states and value commitments. This recognises that identity can be about how you feel.
4. PI necessarily involves some sense of group membership, or non-membership, and identification with a collective. This could be a formal group (e.g. subject specialists) or an informal group. It also recognises that a distinctive 'teacher-educator identity' can be articulated, in the way that it can in other professions, despite the complexities of the role.

This definition embraces much of what has been written about TEs. It is not incompatible with Wenger's conceptualisation of identity, but it perhaps highlights the emotional dimension of being a TE and the impact of the political dimension of 'the local and the global'. It is fitting that any definition of 'PI' should draw on different perspectives, as the professional world is complex and messy; a single perspective could limit the scope of analysis.

3.3.2 Professional identity in the context of critical realism

Davey's definition of PI is consistent with a CR perspective (2010), embracing aspects of structure and agency, and provides a lens to examine the work of a particular group of TEs: what they do, how they do it and why they decide to act in certain ways. The definition is effectively suggesting that the work of TEs will be influenced by:

- A. past histories, including roles and experiences (see points 1 and 3 above);
- B. the professional knowledge that they hold and value (1, 2 and 3);
- C. how they see this complex role (2 and 4);
- D. the political, institutional and cultural environment in which they work and their response to that environment (2, 3 and 4);
- E. the relationships they have within the institution, with their peers, with teachers and with student teachers (1, 3 and 4);
- F. their sense of agency – the extent to which they are empowered to drive their own professional development, and make their own decisions, alongside how they negotiate the complexities of the role (1 and 2).

This list overlaps with the dimensions of teacher education that emerged from Scott's typology of structures. Discursive structures are represented in points B and D; institutional structures in point E; and structures of agency in points A and F.

Drawing on the tenets of CR and the concept of professional identity, I have thus identified the dimensions of teacher education that need consideration in the design of my research instruments (see Chapter 5). The literature on PI informed my investigation of 'agency'. In Chapter 4 I set out the theories which underpinned my investigation of social structure in the context of teacher education.

Before setting out my research questions in critical realist terms, I will explain how my interpretation of 'agency' and 'structure' (based on Scott) differs from some studies that I have considered in developing my understanding of the ideas (Hodgkinson-Williams, et al., 2017; Priestley, 2011a). I will then return to these alternative interpretations in Chapter 8 in order to demonstrate how the framework set out here – including embodied, discursive and institutional structures – provided insights which enriched the analysis.

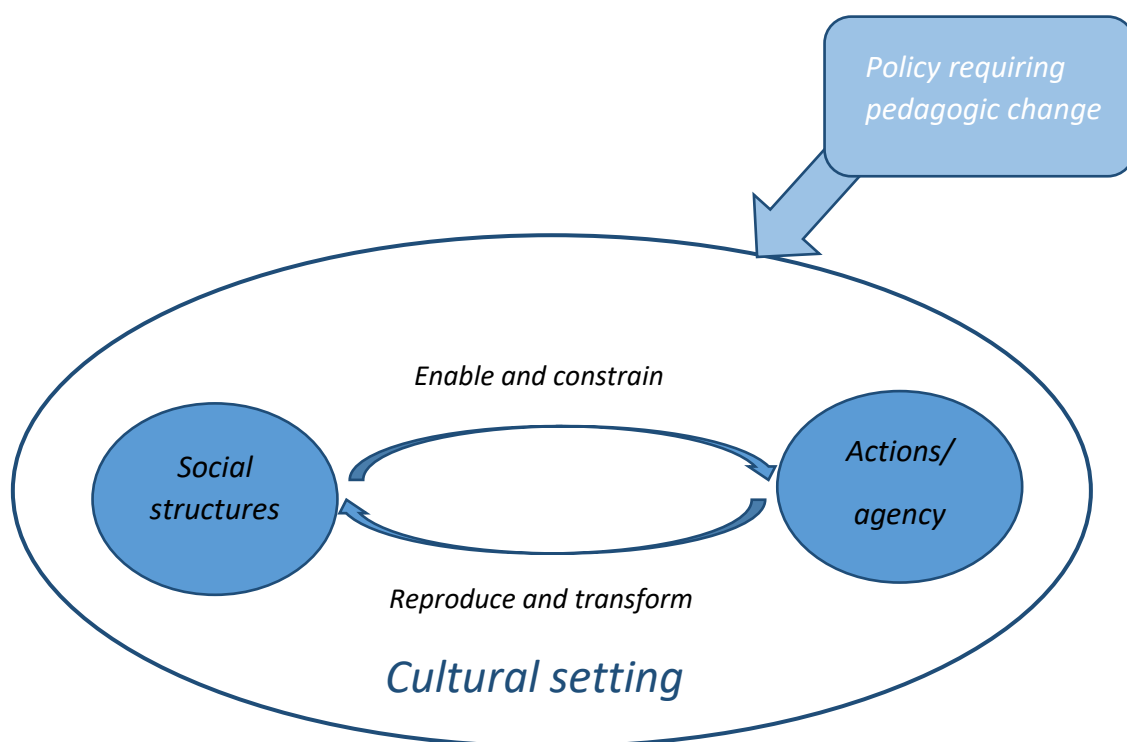
3.4 An alternative interpretation of the concept of 'structures'

A critical realist framework has been used in order to examine the implementation of change in an educational context (Hodgkinson-Williams et al., 2017; Priestley, 2011a). Hodgkinson-Williams et al. studied the adoption and impact of OERs in providing access to affordable education, and Priestley considered the implementation of a new curriculum in Scotland. In both cases, they

drew on Archer (1998a) to argue that the cultural ‘system’ can be treated as separate from the social structures and the actors in the system. The implication is that culture can be measured and manipulated (Mannion et al., 2004). In their theoretical framework, social structures are limited to the embodied and institutional structures; discursive structures are considered to be ‘cultural forms’, which are separate from the social structures. Priestley argues that a new curriculum is an attempt to manipulate the culture of an institution.

In the theoretical framework that I am using, culture is seen as a set of norms and values, emerging as actors take action in a particular socio-cultural setting (Ormrod, 2003), and not something that can be changed from outside the system. The ‘change’ – in case of this study, a set of resources linked to a policy initiative, which promote new pedagogy – acts to potentially disrupt the structures and/or the actors, in order to be absorbed, absorbed to some extent, or rejected. This is represented in Figure 3.2. The changes may eventually change the culture, but that will happen as a result of changes to the social structures, or the activities of the actors. As an ‘emergent property’, the changes to culture may be unintended consequences. This interpretation of culture as emergent is consistent with evidence from the field of international development which has shown that changes imposed from outside rarely play out as intended (Schweisfurth, 2011) and often do not lead to cultural changes. Also, as an outsider, it would be difficult for me to fully understand, or to encourage changes to the culture of this institution. It is possible, however, to engage with the discursive structures – the ideas and attitudes which underpin the work of this professional group.

Figure 3.3 A representation of how changes in policy impact on a cultural setting



I will demonstrate in Chapter 8 (p140) that Scott's typology for social structures provides an explanatory framework which is helpful in the context of pedagogic change, and that by treating the 'discursive structures' as a cultural form, both Priestly (2011) and Hodgkinson-Williams et al. (2017) limited the scope of their analysis.

3.5 Research questions in critical-realist terms

This study involves investigating the relationship between structure and agency in order to reveal the underlying causal mechanisms that give rise to the observed 'experiences' (the empirical level of reality) and 'events' (the actual level of reality) (Fletcher, 2016; Tikly, 2015). It is set in teacher education, a field in which a widely-researched issue is professional identity. This is an emergent property in the study – it emerges as actors take action in the social setting. What is known about PI has enabled me to operationalise the CR framework for TE and informed my research instruments.

In Chapter 1, I stated my overarching research questions (RQs) as:

What are the conditions that enable and constrain TEs in a Kenyan university in their work with student teachers?

How do these impact on their ability to implement changes in their practice?

Re-framing this in CR terms, my research questions become:

1. *What structures enable and constrain TEs in shaping their agency and developing their pedagogy in line with policy aspirations?*
2. *What are the TEs' perceptions of their agency in relation to their role in this institution?*
 - *How do they manage the tensions that arise between different aspects of their role?*
 - *To what extent are they able to exercise agency in their role as a TE?*

As explained at the end of Chapter 1, I am seeking explanations which will inform my work in international development, and the focus on pedagogic change. This leads to a third research question:

3. *What are the underlying causal mechanisms operating in this situation which impact on the capacity of individuals to embrace pedagogic change?*

In the next chapter, I will draw further on the literature in the field and identify the social theories required to understand pedagogic change in the context of teacher learning.

4. Understanding pedagogic change

In this chapter I set out the literature which informed my investigation of the social structures. Drawing on Scott's (2010) typology, I focussed on the discursive, embodied and institutional structures. The discursive structures - the ideational resources and psychosocial narratives which inform the work of the group – will be informed by ideas about the nature of knowledge about teaching, teacher learning and student learning. In the prevailing policy-context it is appropriate to relate these to ideas about learner-centred education, and theories about how change might be implemented.

CR is 'theory-driven' – any CR study should draw on social theories relevant to the context under investigation, in order to provide an analytical framework and to support the inferences required to identify the underlying causal mechanisms. CR asks that we are critical of the theories, recognising that social theories provide a way of thinking about social situations rather than an empirical truth. This chapter therefore presents a critical discussion of some of the theories relating to learning, knowledge and change. It is in three main sections. Firstly, the discourse around **teacher learning** highlights the ideas that might underpin the activity in which my participants are engaged (training teachers); secondly, is an examination of what is meant by **learner-centred education (LCE)**, as this is a key component of the policy context (and the basis of the pedagogic changes required); and thirdly in order to assess the prospects for pedagogical change driven by this professional group, the literature surrounding **change in educational contexts** and the implementation of new practices is considered.

4.1 Teacher learning

Learning to be a teacher is a complex and often haphazard process (Leach & Moon, 2008), influenced by individual experiences and beliefs, and the cultural context (Opfer & Pedder, 2011). It involves learning to make many rapid decisions in a short period of time (McIntyre, 2002) in order to respond to the needs of a large number of different learners. The literature provides many conceptualisations of teacher learning reflecting different views on the nature of knowledge about teaching, views on teachers as learners, and the different stages of teachers' development. Although they also work with in-service teachers, my participants' main role is to teach pre-service teachers, so I will focus on models of teacher learning and the nature of knowledge about teaching, appropriate for pre-service teachers. Most of the literature on teacher learning originates in Europe, the USA and Australia. Key ideas from this Western literature are considered first followed, in section 4.1.4, by what is known specifically about teacher education in SSA.

4.1.1 The nature of knowledge, teaching and teacher learning

It is generally assumed that there are certain things teachers need to know, and that teachers who 'know more' will teach better (Cochran-Smith & Lytle, 1999) but 'knowing more' is a problematic concept. Pre-service teachers need to 'know about teaching' – but what is it that they need to know? There are different conceptualisations of knowledge and different types of knowledge; and what 'knowing about teaching' might mean depends on how knowledge about teaching is conceptualised, and the types of knowledge that are considered important. The prevailing view on what constitutes 'knowing more' will determine how teacher learning is organised and supported. The challenge, perhaps, is that the link is sometimes lost with academics taking a view about knowledge for teaching which is not necessarily reflected in practice (Cochran-Smith & Lytle, 1999).

Desforges (1995) sets out a model for teacher learning based on a view that knowledge is constructed through experience. Learning to teach is seen as an individual cognitive process, in which the values and beliefs that a teacher holds (schemata), often as a result of their own experiences of being taught (Miller & Shiflet, 2016), are being continually challenged and replaced. In this process, critical incidents will produce cognitive conflict (Piaget, 1973) and a reassessment of values and beliefs. To some extent, this resonates with my own experiences of learning to teach and of supporting student teachers in analysing experiences in order to identify alternative approaches, but it abstracts teacher experience from the setting and therefore provides an incomplete picture of teacher learning. Shulman and Shulman (2007) also take the view that knowledge about teaching is constructed during practice, but attach more significance to the social dimension, seeing teaching as a collective activity - their model for teacher learning foregrounds collaboration and reflection. Putnam and Borko (2000) and Kelly (2006) suggest that knowledge about teaching is situated within a particular social and cultural context and is inseparable from the context and culture in which it is generated, and that teachers learn through participation within communities of practice, within the context. They reject the idea of a knowledge base for teaching, generated outside the site of practice. In working with TEs in Kenya, Zambia and Uganda, I appreciate the importance of context and the difficulties of transferring ideas about how teachers might learn across contexts.

In an exploration of what teachers 'knowing more' might mean, Cochran-Smith and Lytle (1999) identify three types of knowledge about teaching – knowledge *for* practice, knowledge *in* practice and knowledge *of* practice. What these mean and the implications for teaching and teacher learning are summarised in Table 4.1 (adapted from p254).

Table 4.1: A summary of different types of knowledge about teaching and the implications for teacher learning

Type of knowledge	View of knowledge	View of teaching	View of teacher learning
Knowledge <i>for</i> practice	Knowledge is objective, fixed, external to the knower.	Applying received knowledge to a practical situation.	Teacher learning involves gathering information in order to become more knowledgeable and expert in the field.
Knowledge <i>in</i> practice	Knowledge is socially constructed through taking part in practice.	Teaching as action – acting and thinking wisely in the immediacy of the classroom to solve problems.	Teachers will learn through collaboration and reflection on practice – making the implicit explicit.
Knowledge <i>of</i> practice	Knowledge exists in communities collectively, constructed in a particular socio-cultural setting.	Teacher as agent who is able to mediate the social, cultural and political environment in order to build a relationship with learners. Teacher as inquirer who raises significant questions about practice.	Teacher learning involves challenging assumptions and others' interpretations, ideologies and practices. It involves working collaboratively to build new relationships.

This demonstrates the complexity of teaching and provides a way of thinking about how teacher education might be organised, so that teacher learning takes place. The challenge is that practice in sub-Saharan Africa often reflects a view that knowledge is objective and that 'knowledge for practice' is the most important type of knowledge (Dembele & Miaro-II Be-Rammaj, 2013; Moon & Umar, 2013b; Vavrus, 2011; Verspoor, 2008), whereas the literature suggests that a conceptualisation of knowledge as existing within communities of practitioners better represents the nature of knowledge about teaching (Kelly, 2006; Putnam & Borko, 2000). Lunenberg et al.'s, analysis (2014) suggests that all types of knowledge are important for teacher educators, with many new teacher educators experiencing tension around the expectations to become academics with a research profile, and hence develop their knowledge for practice. In the African context the lack of knowledge of practice is perhaps more significant (Akyeampong, 2017). This debate informed my analysis of the discursive structures that prevail in the institution used for the study.

Shulman (1986) suggests that a key aspect of a teacher's knowledge base is 'pedagogical content knowledge' (PCK). How does this fit into the framework set out in Table 4.1?

Pedagogical content knowledge

PCK is the knowledge that teachers hold about how to represent their subject to learners, taking account of the interests and abilities of the learners; it is a blend of content (subject) knowledge and pedagogical knowledge and describes the 'special' knowledge that good teachers hold but subject experts might not (Shulman, 1986). It is a concept that has endured for more than 30 years, but, given more recent contributions highlighting the socio-cultural nature of knowledge about teaching, should perhaps also include explicit reference to the context in which a subject is being learnt.

The concept of PCK does not fit neatly into the typology in Table 4.1, being a hybrid of all three knowledge types (Cochran-Smith & Lytle, 1999). Attempts to codify PCK are problematic. For example Loughran et al. (2004), working with a group of science teachers, broke PCK down into 'content representation' and 'professional and pedagogical experience repertoires'. The result was a 32-page booklet on how to teach 'particles' – just one of many topics in the science curriculum – creating an unmanageable amount of material for teachers to process. However, the process of engaging in in-depth discussions about how to teach certain topics that incorporate reflection and collaboration, and go beyond 'top tips', is a valuable form of CPD for teachers, rather than the formal output of those discussions.

In the context of this study, a question for the analysis was how is PCK perceived and how and when do student teachers have the opportunity to develop their knowledge of how to teach their subject.

4.1.2 Other aspects of learning to teach

There is a consensus in the literature that learning to teach is much more than acquiring knowledge. It involves developing a vision for effective teaching (Shulman and Shulman, 2007), developing a professional identity (Malderez et al., 2007) and challenging existing values and beliefs (Borko et al., 2000; Shulman and Shulman, 2007). This means that teacher education has an explicit emotional dimension, contrasting with other traditional university courses (Malderez et al., 2007; Taylor, 2008).

In a study of a group of pre-service teachers, Mutton et al. (2008) focus on student teachers as learners, identifying learners as 'deliberative' or 'reactive'. Those who are 'deliberative' are more likely to draw on a wider range of physical and intellectual resources, respond positively to feedback, capitalise on the context and be aspirational in terms of the sort of teacher they want to be. The implication is that a teacher preparation course should provide the conditions for 'deliberative' behaviours to develop, with a clear emphasis on learning how to learn (Hagger et al., 2008).

Reflection and collaboration are key aspects of models of learning to teach (e.g. Desforges, 1995; Putnam & Borko, 2000; Shulman & Shulman, 2007), and are consistent with a view of knowledge about teaching as being socially constructed and a view of learning to teach as becoming encultured into a professional community of practitioners, supported by ‘tools’ which can expand the capacity for innovation and invention (Ball & Cohen, 1996; Putnam & Borko, 2000).

4.1.3 The implications for teacher-education programmes

The purpose of this review is not to synthesise a view of teacher learning, but rather to set out the possibilities. This is consistent with the tenet of CR set out in Chapter 2, which invites critical realists to draw on social theories appropriate to the research problem, rather than to adopt a particular stance. Tikly (2015) argues that in the context of studying learning, multiple perspectives are helpful, and that emphasising one view of the nature of knowledge and learning over another will restrict the analysis and not take account of practical realities. In analysing my data, I looked for evidence that would enable me to identify the nature of the discursive structures that underpin this BEd in secondary science education (see chapter 6).

Taking the view that different models and conceptualisations of learning to teach offer helpful insights, it is appropriate to synthesise a view of what elements teacher-preparation courses might, and probably should, contain. This provides some principles against which the social structures which emerge from my data could be compared.

The literature described above, suggests that in order to support students in developing appropriate knowledge for teaching, a teacher-preparation course should provide the opportunity for student teachers to:

- acquire different types of knowledge (Cochran-Smith & Lytle, 1999), including pedagogical content knowledge (Shulman, 1986);
- develop a vision for effective teaching (Shulman & Shulman, 2007);
- discuss and analyse teaching (Shulman & Shulman, 2007);
- take part in practice, supported by experts (Putnam & Borko, 2000; Shulman & Shulman, 2007);
- work collaboratively, articulating their developing vision and understandings of teaching and learning (Kelly, 2006);
- access tools to support student and teacher learning (written, technological or social) (Putnam & Borko, 2000);
- develop as learners, reflective practitioners and problem-solvers (Hagger et al., 2008; Mutton et al., 2008);

- make sense of the cultural context in which they will be teaching, including prevailing attitudes and values, and the regulatory frameworks (Taylor, 2008).

It is important that teacher education models the sort of pedagogy that is being promoted (Cochran-Smith, 2006), although the evidence suggests that this is difficult (Cochran-Smith, 2003, 2009). ‘Pedagogy’ is about attitudes and values as well as what teachers actually do (Leach & Moon, 2008), which implies that modelling should go beyond particular teaching approaches to include a clear, explicit vision for effective teaching and learning, and ways of working which are both reflective and collaborative. Cochran-Smith and Lytle (1999) propose a model for teacher education which they refer to as ‘inquiry as stance’. They see knowledge about teaching as being socially constructed by TEs, teachers and student teachers as they work together, drawing on past experiences and cultural resources to form and re-form frameworks for understanding practice. This is consistent with what Bruner (2002) refers to as a pedagogy of mutuality in which the classroom (in school or university) is a ‘sub-community of mutual learners, with the teacher orchestrating the proceedings’ (p15). It also suggests a model for collaboration based on the idea of ‘communities of practice’ (Wenger, 1998) in which learning is seen as a joint enterprise of negotiation and reflection, taking place through mutual engagement in practice, with all participants being valued equally. Recent contributions argue for collaborative professional networks as a vehicle for professional development and identify features of such networks, which include flat power structures, collaborative inquiry and constant interaction inwards (Rincón-Gallardo & Fullan, 2016).

It is the opportunity to take the widest possible view of teaching, working across many different schools, that provides TEs with the possibility to be agents of change for teaching and learning. This ‘ideal’ will provide a lens through which to examine the work of a university department that is part of the TESSA network. It is appropriate therefore to consider what is known about teacher education in sub-Saharan Africa.

4.1.4 Teacher education in sub-Saharan Africa (SSA)

It is widely accepted that teacher-training courses in many developing countries are highly theoretical and do not involve enough time in school (EFA GMR team, 2013; SEIA, 2007). The content and process of such courses do not reflect the culture and conditions in the contexts in which teachers work (Okoffo Manteau, 2012; Polly & Hannafin, 2011) and there is a view that teacher education in SSA is not fit for purpose (Heneveld et al., 2006; MoE and MoHEST, 2012; Verspoor, 2008). Institutional structures and ways of working still position teachers as ‘passive enactors of pedagogic strategies’ (Murphy & Wolfenden, 2013, p264), resulting in a misalignment between policy and practice. Hierarchical relationships between teachers and teacher educators limit the opportunities for teacher educators to learn about new approaches or to question their

own practice (Akyeampong, 2017). There is little opportunity for student teachers to develop their PCK (Shulman, 1986), with 'methods' often being taught in a separate department from subject content (Vavrus, 2011). Many of the features of teacher education listed above are not evident in teacher-education programmes in SSA.

Cochran-Smith (2006) argues that TEs could be positioning themselves as 'public intellectuals' – people to challenge prevailing views and expose some of the myths and contradictions – 'working simultaneously within and against the system' (p203), and are therefore potential agents of change. It has been suggested that central to supporting change is understanding the identities that TEs construct for themselves, and how they see their role, their motivations and attitudes (Robinson & McMillan, 2006). A critical realist would argue that this is not enough: it is how the prevailing structures constrain and empower them that will ultimately determine the extent to which they see themselves as agents of change. My hypothesis is that something about the structures is constraining TE in developing more relevant teacher preparation programmes.

The situation is not helped by the fact that TEs in developing contexts, often have a deficit model of teachers (Dyer et al., 2004), or see them as inferior (Akyeampong, 2017), blaming them for failing to implement effective practices rather than examining their own, teacher education, practice. However, TEs rarely receive specific training for their role; and, where they do, the evidence is that it has little impact (O'Sullivan, 2010). In an analysis of a 'Diploma in Teacher Education' in Uganda, O'Sullivan reports that the content of the curriculum does not match the objectives; there is a lack of pedagogical focus; and there is no support for TEs in developing skills as reflective practitioners or researchers. The reasons for this will be multi-faceted, historical, cultural and highly complex, and there is some synergy between these well-known issues and my own professional dilemma.

In the context of new school curricula (eg Uganda, Zambia and Kenya) and policies which are calling for significant changes in classroom pedagogy, the lack of effectiveness of teacher education is a concern. New policies and curricula are underpinned by calls for more 'learner-centred' education yet it remains a contested and often undefined term. TEs are in a position to lead this discussion and understanding what it might mean is important in considering the prospects for pedagogic change at all levels of the system.

4.2 Learner-centred education

Policy aspirations across SSA require teachers to develop more active approaches to teaching and learning, and this is often framed in terms of being more 'learner-centred' (e.g. Kenya, Zambia, Ghana). My work with teachers and TEs over the last three years as TESSA AD has shown that it is interpreted in many different ways, and that there is a gap between the theory and common

practices. LCE is part of the policy context for teacher education in Africa. The purpose of this section is to define LCE and to consider what is known about its implementation, rather than to critique LCE as a policy itself, although it should also be noted that it has been suggested that LCE is not an appropriate policy choice for Africa (Tabulawa, 1997) and that adaptation is needed for the African context (Vavrus, 2009).

In Kenya, LCE is mentioned in the Draft Policy Framework (MoE and MoHEST, 2012) but is not defined. The implication is that it will provide the route to achieving the vision set out by Ndung'u et al. (2009), providing a curriculum which is inclusive and relevant, and deliver a range of skills including entrepreneurship, problem-solving, literacy and numeracy as well as inculcating a desire for life-long learning. There are issues in defining and in implementing LCE which mean that despite many well-intended interventions, the quality of teaching across Africa remains low (Bold et al., 2017).

4.2.1 Defining learner-centred education

Drawing on some of the literature in the field of comparative international education (Barrett, 2007; Brodie, Lelliott, & Davis, 2002; Mtika & Gates, 2010; O'Sullivan, 2004; Polly & Hannafin, 2011; Schweisfurth, 2013; Thompson, 2013; Vavrus, 2009; Westbrook et al., 2014) it seems fair to say that LCE has its basis in the work of Piaget, Dewey and Vygotsky and is underpinned by the following principles:

- Knowledge is constructed by the learner as a result of the activities that they undertake and the experiences that they have. Teacher cannot 'make' students learn, only create the conditions enabling them to do so.
- Learning is a process which involves building on prior knowledge and experience in order to develop new understandings. Teaching involves understanding and engaging with learners' ideas.
- Language is central to learning and to thinking, and therefore to the development of higher cognitive processes. Learners need the opportunity to articulate their knowledge and understanding.
- Prior knowledge and experiences, and the use of language, will be determined by the social and cultural context in which the learner is located.

In trying to establish how LCE might manifest itself in classrooms, Schweisfurth (2013) attempts to unravel the complexity by thinking of LCE in terms of a set of classroom-based continua. She suggests that educational practice can be considered to be 'less learner-centred' or 'more learner-centred'. She identifies a further four continua which summarise the key aspects of LCE: technique (transmission vs independent or group inquiry), relationships (authoritarian vs democratic), learner motivation (extrinsic vs intrinsic), and the nature of knowledge (knowledge

as fixed vs knowledge as fluid). Finally, two central continua cover the role of the teacher (authoritarian or facilitator) and the nature of the curriculum (fixed or negotiable).

The continua provide a way of thinking about LCE in practice. For many teachers, adopting LCE represents a paradigm shift, and the evidence from around the world is that this is difficult to achieve. By conceptualising LCE in this way, it is possible to evaluate practice in terms of progress along a continuum, which can be helpful for the gradual building confidence and changing behaviour (O'Sullivan, 2004; Barrett, 2007; Vavrus, 2009). However, it could be argued that the teacher's view of the learner - ability as fixed vs all learners have the capacity to learn - is a central feature of LCE, which is not covered by Schweisfurth's continua.

Schweisfurth also provides a definition for LCE:

“A pedagogical approach which gives learners, and demands from them, a relatively high level of active control over the content and process of learning. What is learnt, and how, are therefore shaped by the learners' needs and capacities.” (p20)

The definition is also problematic. At face value, it cannot be disputed. However, one purpose for creating a definition might be to help to explain LCE to teachers and student teachers, and a definition that focuses more on the teacher might be more meaningful. For example, the evidence from the implementation of 'outcomes-based education' in South Africa is that teachers interpreted the notion that LCE 'demands from learners active control over the content and process of learning' as having to do very little themselves (see Schweisfurth, 2013, p112).

In a study of teachers involved in an in-service programme designed to promote learner-centred practices, Brodie et al. (2002) found that many teachers adopted some of the practices (the 'form') without necessarily adopting the underlying attitudes (the 'substance'). They suggest that for sustainable change, the 'substance' of LCE needs to be adopted – underlying beliefs and attitudes need to be challenged. This distinction between the 'form' and 'substance' of LCE manifests itself through a focus on classroom approaches, with a common misconception being that a lesson is learner-centred if students are working in groups, for examples, with little regard for what they are doing and whether learning is taking place. Conceptualising LCE in terms of attitudes and beliefs rather than particular practices is helpful and underpins Schweisfurth's (2015) 'minimum criteria' for LCE. These provide a helpful way of defining LCE, in a way which speaks to teachers. She presents the standards in terms of what makes a good lesson, but they can be applied at multiple levels within the system. They are:

- Lessons are engaging and motivate pupils to learn.
- Classroom relationships are based on mutual respect.
- Learning challenges pupils and builds on existing knowledge.

- Dialogue is used in teaching and learning.
- The curriculum is relevant to learners' lives and values a range of skills including critical thinking and creativity.
- Assessment tests a range of skills and gives credit for more than recall of knowledge.

(adapted from Schweisfurth (2013), p146)

These criteria provide both a definition of a learner-centred teacher and a framework for the analysis of teaching, for how teaching is assessed, and for how student teachers can be supported. I have used them in my work with teachers, TEs and district officials in SSA, for which Brodie et al.'s notions of 'form' and 'substance' have also provided a useful framework (2002).

It has been suggested (Tabulawa, 1997) that there is a 'need for a socio-historical approach to issues pertaining to pedagogical change' (p192), and that LCE is based on western values, not necessarily appropriate for developing contexts. However, I do not believe that this is the case, particularly in the Kenyan context. Firstly, the definition of LCE offered here (based on Schweisfurth's minimum standards), is consistent with the United Nations Convention on the Rights of the Child (UNICEF, 1989) and The African Charter on the Rights and the Welfare of the Child (UNICEF, 1990) (Schweisfurth, 2013, p39). Its strength is therefore that it is based on a set of universally acknowledged human values, which can be interpreted for different cultures, rather than on a set of prescribed classroom approaches which might indeed be culturally specific and potentially inappropriate. This interpretation of LCE justifies its widespread promotion as an education policy. It does not however imply that implementation will be easy and, in some systems, the universal adoption of the UN frameworks on the rights of the child – and LCE – represents a considerable shift in attitudes and values.

Secondly, in Kenya, even in colonial times, there was a strong independent sector within education, and post-independence, a curriculum review expanded the curriculum to include vocational subjects, signalling an intention that education should deliver a range of relevant skills. This, alongside the early adoption of the principle of universal primary education, suggests that LCE is consistent with Kenya's own objectives for education since independence.

4.2.2 Implementing LCE

In a review of 72 articles on the theme of LCE published in the *International Journal for Educational Development*, Schweisfurth (2011) finds that 'the stories of unequivocal success in implementation are few and far between' (p430). The picture portrayed by Westbrook et al. (2014) is more positive. They report that classroom interventions that promote social constructivist approaches 'seem to be making an impact on some teachers' (p64), although they acknowledge that this impact is 'patchy and still inequitable'. However, they also report that

teachers' subject knowledge (particularly in secondary schools) was found to be a problem and that many teachers were resistant to change as a result of ingrained cultural beliefs. If this is the case, it is difficult to imagine that the classroom interventions observed were being implemented very effectively. Poorly designed group work (the 'form' of LCE), for example, will not support student learning and is possibly worse than the alternative.

The evidence from both of these reviews is that there is certainly a great deal of activity around LCE, even if there is no consensus on the overall impact of such activity. What is clear is that pedagogic change is demanding for teachers and for people working to support teachers.

In Kenya, educational reform has been on the agenda for many years, but is not yielding the sort of innovation intended (Muricho & Chang'ach, 2013). The suggestion is that this is because of the top-down – 'power coercive' (p124) – approach, which does not involve key stakeholders such as parents and teachers. 'Implementation' often involves structural changes rather than a focus on classrooms and pedagogic change, reflecting the fact that this is often easier than trying to change behaviour.

In the next section, I will consider some ways of thinking about implementing change that have provided a conceptual framework for my work as TESSA AD and for this study.

4.3 Implementing change

Educational change is difficult because it involves changing professional behaviours alongside underlying beliefs and attitudes (reculturing) (Fullan, 2007). Educational change also takes a long time and is multi-layered; the people in a position to bring about the change (teachers) are not the policy-makers or the people with control over the available resources (Wedell 2009). Wedell acknowledges that educational change can be painful for those concerned and encourages those with responsibility for implementing change to consider all the variables involved – he lists 12 (p41) as a starting point. They are all sensible suggestions, but this approach is not particularly useful for people involved in implementing change; some sort of theory or meta-level thinking is required. In my attempts to better understand the issues surrounding 'implementation', I came across ideas from the field of healthcare, which have provided insights that are informing my work as TESSA AD, and an analytical framework for this study. It is a sociological theory of implementation (May & Finch, 2009; May, 2013) which attempts to explain how this aspect of the social world operates (Turner, 2013). It is based on the assumption that the social universe reveals certain basic fundamental properties and processes that can explain the flow of events in specific contexts, and I have found the concepts outlined in this theory to be helpful in identifying some of the fundamental principles that underpin implementing educational change. Normalisation Process Theory (NPT) (May & Finch, 2009) conceptualises implementation as taking place

through four generative mechanisms: coherence, cognitive participation, collective action and reflexive monitoring. These are explained in Table 4.2.

Table 4.2: The four generative mechanisms of implementation (May and Finch, 2009)

Coherence – introduces and defines the practice in terms of its meaning, use and utility. It highlights the ways in which it is different from other practices. Coherence requires that actors collectively invest meaning in the new practice, in their context.

Cognitive participation – involves actors engaging with new practices and identifying courses of action, within their organisation, that will lead to the new practices becoming operationalised. Cognitive participation requires actors to interpret and ‘buy in’ to the new practice.

Collective action – involves the actors in taking collective, purposive action towards the agreed goal. Collective action requires actors to operationalise the new practice and mediate it within the appropriate networks.

Reflexive monitoring – involves the continuous evaluation of patterns of collective action, including making judgements about the utility and effectiveness of the new practice. These judgements feed back into ensuring the coherence and meaningfulness of the practice.

This theory draws on empirical evidence from the field of healthcare (May and Finch, 2009), although the ideas have been tested in the field of information technology (Sooklal et al., 2011). Implementation in the context of healthcare involves people changing their behaviour in order to incorporate new approaches and new technology. It is deemed to have been successful when the new process or procedure becomes ‘normalised’ (May & Finch, 2009). Educational change involves teachers and TEs changing their behaviour, so there is some overlap. The sort of changes described by May and Finch require some sort of cognitive engagement, but they don’t necessarily involve fundamental changes in the attitudes and beliefs that underpin practice (Sooklal et al., 2011). Nevertheless, the concepts can be applied in the field of education.

Wedell (2009) uses the terms ‘initiating’ (or planning), ‘implementing’ and ‘evaluation’ when referring to educational change. ‘Coherence’ (table 4.2) is a richer notion than planning, as it recognises the fact that any new practices need to be integrated into current situations and contexts, and that this requires an investment on the part of key actors. ‘Collective action’ recognises the power of the community and collaboration when establishing new ways of working, and ‘reflexive monitoring’ acknowledges that things are not static and that the real value in ‘evaluation’ is in re-defining and modifying the new practices. The notion of ‘cognitive participation’ (‘getting inside people’s heads’) is missing from Wedell’s analysis and is perhaps the step that has been missing from the studies described by Schweisfurth (2011). The change that

these studies focus on is a move towards learner-centred education. The suggestions that 'learning-centred education' (O'Sullivan, 2004) or 'contingent constructivism' (Vavrus, 2009; Vavrus & Bartlett, 2012) would be contextually more relevant and appropriate terms, perhaps demonstrate the challenge of achieving 'cognitive participation' for LCE in developing contexts and the importance of 'coherence'.

Schweisfurth (2011) identifies the 'barriers' to change as

- an over-ambitious and under-resourced reform process;
- local conditions (large classes and a lack of resources) which make it very demanding for teachers;
- inadequate teacher education and a lack of motivation from teachers;
- contradictions in the form of attitudes and values which see teachers as 'experts' and learners as 'empty vessels';
- an inappropriate curriculum and examination system.

As suggested in Chapter 1, I find the concept of 'barriers' to be unhelpful, as they can provide excuses and often mask underlying social realities (Checkland et al., 2007). In terms of the concepts described in Table 4.2, these 'barriers' are a combination of a lack of 'coherence' and a lack of 'cognitive participation'. How to achieve 'coherence' and 'cognitive participation', for example, in the context of educational development projects could be a useful question to ask (more useful perhaps than trying to identify all the possible variables to consider) and deserves investigation.

Critical realism offers a perspective on change which is consistent with the notion of cognitive participation and collective action. In Chapter 3 (p33) I highlighted the fact that it is the actions of individual stakeholders and how they interact with social structures, that will bring about change. Causal mechanisms generate patterns of behaviour - some of which might be problematic in the context of the change required. Sustained changes in the behaviour of individuals will only come about in 'conducive circumstances' (Pawson and Tilley, 1997, p216). What are considered to be 'conducive circumstances' will be different for different individuals and may not lead to collective action. In the context of pedagogic change that supports more active approaches to learning and teaching, therefore, 'conducive circumstances' will be those which support some sort of engagement with (and cognitive participation in) the ideas that underpin learner-centred education, and promote collective action.

4.4 Summary

This chapter has set out the key concepts and theories that underpin teacher education, teacher learning and the policy context for student learning (LCE), and has introduced a model for thinking

about implementing change in educational settings. Drawing on the literature about teacher learning, I have identified some of the desirable features of teacher preparation courses. I have suggested that Schweisfurth's 'minimum criteria' (Schweisfurth, 2013) provide a definition for LCE. These ideas have informed my research design and data analysis. In particular, ideas about teacher learning and LCE provided a framework for my analysis of the 'discursive' structures – the ideas that underpin the work of this group of professionals. A model for change, based on the concepts of coherence, cognitive participation, collective action and reflexive monitoring has been introduced and will be re-visited in Chapter 7 when I discuss the implications of my findings for pedagogic change.

In the next chapter, I explain how I developed my methodology in order to investigate the social structures in a university department which trains secondary science teachers (RQ1), and how TEs perceive their agency in relation to their role as a TE (RQ2), and ultimately identify the causal mechanisms impacting on the capacity of individuals to embrace pedagogic change (RQ3).

5. Developing a methodology within a critical-realist framework

Critical-realist research requires ‘an intensive study, with a limited number of cases, where the researcher systematically analyses the interplay between the ontological layers’ (Bygstad et al., 2016, p85). This is because the causal mechanisms which arise from structures and actors are not observable (although the effects of those mechanisms are) (ibid), so the research needs to provide the opportunity to make inferences, based on evidence, that will uncover and describe the mechanisms which produce the observed events. With this in mind, and taking account of the practical implications of collecting data in Kenya, I designed a qualitative study based on working closely with five TEs in the same department of education, all of whom were involved in training secondary science teachers. A qualitative methodology is appropriate for investigating how people behave and what aspects of the social environment empower and constrain them (Cohen, Manion, & Morrison, 2017)

In order to investigate structure and agency, and ultimately to identify the underlying causal mechanisms which impact on teacher educators’ capacity (in this university) to be agents of change, I developed a methodology which provided

- access to the social structures (discursive, institutional and embodied) that prevail in this department of education (Fletcher, 2016; Scott, 2010);
- access to the past experiences, values, beliefs, interests and agendas (Checkland & Casar, 1986; Davey, 2010) of my participants, and their professional identity.

Other researchers working within this paradigm have conceptualised their work as a case study (Bygstad et al., 2016; Davis, 2013; Easton, 2010; Fletcher, 2016; Wynn & Williams, 2012).

However, a key tenet of the CR paradigm is that reality is an ‘open system’ (Bhaskar, 1994; Scott, 2005; Wynn & Williams, 2012) which is beyond our ability to control directly. This is not consistent with the notion of a ‘bounded’ case (Bassey, 1999); it is not always clear at the outset where the inspiration for the inferences which will lead to the causal mechanisms will come from, and therefore how the case should be bounded. In this respect, notions of a three-dimensional case study (Segar et al., 2015) in which the boundary of the case emerges during the research, and a vertical case study (Bartlett & Vavrus, 2014) in which wider aspects of the context are taken into consideration, are helpful. I am not, therefore, conceptualising this study as a conventional ‘bounded’ educational case study, but rather as a small-scale ethnographic study which draws on multiple qualitative methods in order to understand my participants and the context in which they work. The ‘boundaries’ of the study will become clear as the study progresses and wider aspects of the context may need to be considered. In this chapter, I explain what I mean by this,

and consider the impact of my position as a TE and the ethical dilemmas that emerged at the various stages of the research. I describe the data collection methods; how I ensured reliability and credibility; and how I analysed the data.

5.1 Research design

This study was not a conventional ethnography, involving immersion in the field, but it was ethnographic in nature (Denscombe, 2003). The aim was to gain a holistic understanding of the context by gathering data in a naturalistic setting (Cohen et al., 2017). In its design, I drew on ideas from other CR studies and CR theorists (Avenier & Thomas, 2015; Davis, 2013; Fletcher, 2016; Scott, 2005, 2010; Tao, 2013). From these studies, the common features of CR research that emerged are:

- taking steps to thoroughly understand the context in which the study is taking place;
- intensive engagement with multiple data sources;
- in-depth interviews with participants in order to understand their perspectives.

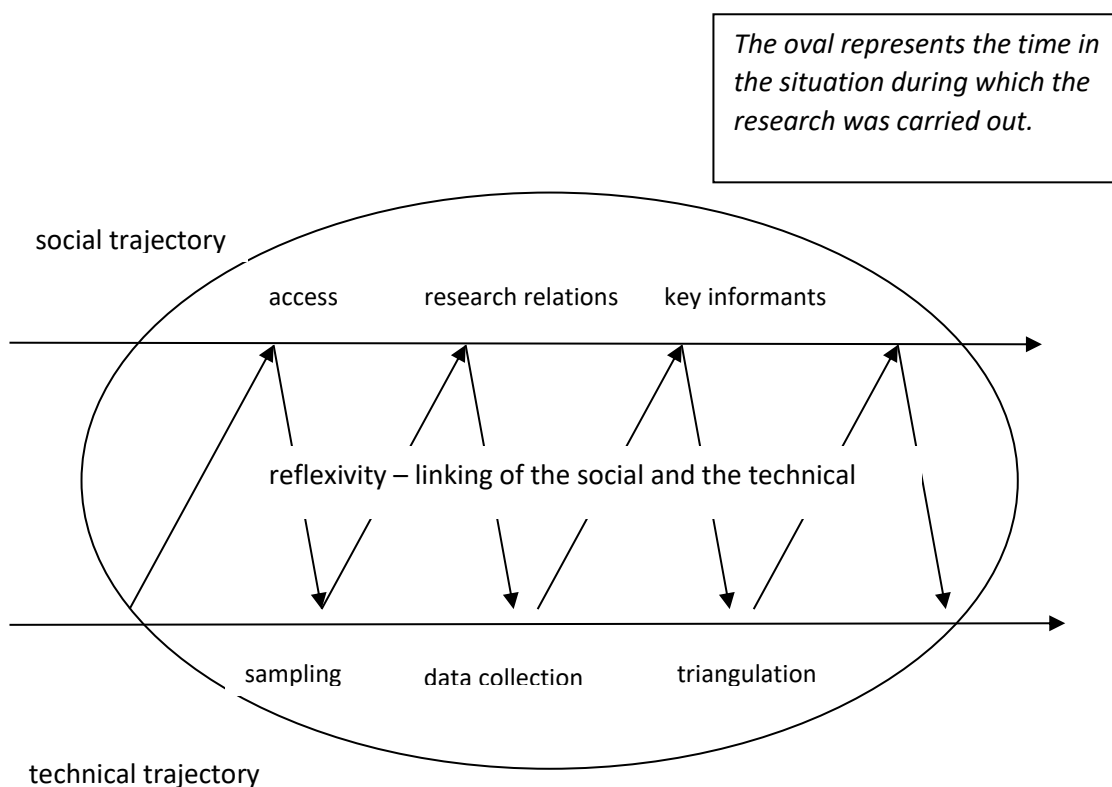
A feature of the other studies is that they relied on interviews rather than observation. However, given the importance of understanding people's actions (Archer, 1998c), I saw observation as important in building the holistic picture required (Wynn & Williams, 2012).

In order to understand the context of the study in as much detail as I could, I read and analysed the Kenya Policy documents (MoE and MoHEST, 2012, 2014, 2015) before embarking on fieldwork. I interviewed the architect of TESSA, Professor Bob Moon, about the thinking behind it and how he thought it could bring about change. This interview was significant because it highlighted the professional dilemma that underpins this study – the apparent resistance to change in teacher-education institutions – and helped me to understand the context in which the TESSA approach was developed. Finally, I re-read all my field notes from previous visits to the institution.

Ball (1993) argues that, in naturalistic settings, social interactions are highly significant and that technical rigour comes from 'the conscious linking of the social process of engagement in the field with the technical processes of data collection, and the decisions that that linking involves' (p33).

This is illustrated in Figure 5.1.

Figure 5.1: Heuristic representation of the research process in a naturalistic setting (Ball, 1993 p35)



Ball (1993) is suggesting that it is helpful to think about research in naturalistic settings in terms of what needs to be achieved (the technical trajectory) and the building of relationships with the participants (the social trajectory). The implication is that a strong social trajectory provides rigour, and that focusing only on the technical issues could limit the potential richness of this sort of study. The social trajectory for my research came from having worked with some of the participants in different contexts; from knowing about their lives and families, and from shared values and ambitions for the education system in Kenya. Visiting the institution in order to conduct the research was also important. I stayed on the campus, and interviewed all my participants in their own offices. Although Ball does not make specific reference to CR, his ideas are particularly relevant owing to the importance of context and the challenge of gaining the sort of insights required from the position of an outsider. I was able to draw on the social trajectory in order to enrich the data. For example: on a previous visit in 2015, I visited student teachers on TP with two of the participants. This did not form part of the primary data, but I cannot ‘unknow’ what I learned on that visit, so I used the field notes from that visit as secondary data to confirm (or dismiss) my emerging ideas about the findings.

A key aspect of any qualitative study is the relationship between the researcher and the participants (Baszanger & Dodier, 2004; Cohen et al., 2017). My 'position' influenced the way I conducted the study.

5.2 Positionality

In this study, I could be considered to be both an outsider and an insider. That is, I am both a researcher new to the research context, from a different culture but I have knowledge and understanding of the issue or practices being researched, and have worked with my participants since 2011 (Savvides et al., 2014).

Each position has benefits and drawbacks, and it is perhaps helpful to think in terms of a 'third space' (McNess et al., 2015) which combines the insider and outsider perspectives and acknowledges that researchers can move between the two. This concept is called 'otherness' (Savvides et al., 2014), 'inbetweenness' (Milligan, 2016) and 'the space between' (Dwyer & Buckle, 2009). It reflects the fact that it is possible to simultaneously be an insider and an outsider, recognising that your position may change as the research progresses (Milligan, 2016).

As a British citizen working in Africa, I am inevitably an 'outsider'; I cannot begin to understand the subtle politics and power relations that will influence the daily lives of these TEs. However, as a TE investigating a group of TEs, I could be considered to be an insider. As a result of my professional knowledge and experience, I will 'hear what is not being said' (McNess et al., 2015, p307), and I have a depth and breadth of understanding of the issues that will give me access to insights that might not be available to someone from a different professional background (Dwyer & Buckle, 2009). It is inevitable that I will notice particular things (as well as the absence of others) and make judgements about what I see in line with my own appreciative setting (Vickers, 1965); the challenge will be to beware of this and any limitations it is placing on what I notice. CR is a 'theory-seeking' paradigm (Maxwell & Millapalli, 2007), the aim being to find evidence to support social theories relevant to the situation. This means that the absence of certain phenomena will be relevant to the study and will contribute to my understanding of the structures, so being a TE myself is helpful in this respect.

Effectively navigating this 'third space' depends on establishing empathy (McNess et al., 2015) and exercising critical reflexivity (Savvides et al., 2014). 'Empathy' implies 'entering into another's personality and imaginatively experiencing his experiences' (Chambers dictionary, Kirkpatrick, 1983, p409). Operating as a cultural outsider, this is ambitious, and gaining access to another's point of view is probably the best that can be achieved. I would suggest this is also linked to establishing trust between the researcher and participants (Bond, 2012). Establishing trust and 'empathy' depended on upon how I managed my position and was helped by picking up on social

cues, recognising what was and was not feasible, being a good listener and asking relevant follow-up questions rather than sticking rigidly to an interview schedule.

Alongside building trust (Bond, 2012), critical reflexivity – or continuous self-awareness (Savvides et al., 2014) – is at the heart of what it means to occupy ‘the space between’, and trying to understand the perspective of the other person. Respect, empathy and awareness of the participant’s situation will be easier for as an insider, and this provides a strong argument for my working in a familiar context. By building on relationships already established, with colleagues with whom I share a commitment to the TESSA programme and who work in the same field of TE, I was able to ensure a strong social trajectory (Ball, 1993).

I had worked with two of my participants since 2010, and had visited twice, prior to this study. Through their relationship with TESSA, they have had opportunities to develop their careers and therefore their standing within the institution. During a visit in 2015 to monitor the use of TESSA SS, I took the opportunity to identify potential participants and to negotiate access for a second visit. My research is centred on a group of five science TEs in a university setting in which I was known. A tension is that these colleagues associate me with TESSA, and presenting myself in a new role (as a researcher) was important; the trust and respect we have for each other made this possible.

‘Being reflexive’ required me to continually review and reflect on my data, and on the link between the social and technical trajectories (Ball, 1993). In practice, I kept very detailed field notes, employing different colours for different types of events, summarising the data each evening, and identifying questions to pursue or avenues to follow the next day. My position as insider/outsider also had ethical implications.

5.3 Ethics

In order to analyse the ethical dilemmas in this research, I used a framework to structure ethical thinking developed during my Masters study (Stutchbury and Fox, 2009). The framework encourages the researcher to consider their project from four different ethical perspectives: external, consequential, deontological and relational. It provides a way of thinking about ethics, and its strength comes from the fact that it links behaviours and methodology. As an epistemological tool, it is not linked to a particular paradigm or worldview; rather it provides a set of questions in order to interrogate a situation. Any particular stance will be reflected in the answers to those questions, rather than through the questions themselves. It is therefore appropriate to apply this framework to this study. Given my position as an insider/outsider and the desire to find out about agents’ intentions, ethical deliberations are about the interaction

rather than the actions of the researcher and cannot be separated from methodology (Parker, 2007); the framework supports this view.

The framework perhaps works because it is based on Moral Theory (Seedhouse, 1998) and raises questions which can be considered in any cultural context or any research paradigm (Small, 2001). There are two classical theories of western moral philosophy (consequentialism and deontology) which, if followed literally, may lead to conflicting rules and principles (Seedhouse, 1998). By considering both perspectives, this framework opens up debate, whereas strict adherence to ethical codes can close it down (Hammersley, 2009). Using the framework involves generating a set of questions to interrogate each perspective (Stutchbury and Fox 2009). The questions will vary depending on the context of the research, and the ones I used are in Appendix 1.

A strength of the framework is that it draws on appropriate ethical codes but is not limited to them; it encourages ethical thinking (Homan, 1991), links ethics and methodology, and ensures that ethical decisions are recoverable and transparent (Stutchbury & Fox, 2009). Much ethical discussion in educational research focuses on a particular ethical code, which inevitably reflects a particular set of cultural values which may not be relevant in cross-cultural contexts (Robinson-Pant & Singal, 2013). Also, since methodology is likely to evolve, a set of ethical principles considered at the beginning of the project is insufficient as a basis for examining ethical dilemmas (Hammersley, 2009; Parker, 2007; Schrag, 2011). In this framework, the appropriate ethical codes become part of a much bigger picture, rather than the whole picture, which is particularly important when the research is taking place in a different cultural setting from the one in which the ethical codes to which the researcher is expected to adhere were developed.

In the next section, I will apply the framework to my study and explain the dilemmas that emerged, how some of them were related to my position as insider/outsider, and how I tackled them.

5.3.1 Ethical analysis

The ethical framework invites a researcher to examine a project from four ethical perspectives: the external, the consequential, the deontological and the relational.

5.3.1.1 External considerations

The **external** (or 'macro') perspective includes issues surrounding the law, codes of practice, and use of resources available. The user is encouraged to reflect upon the implications of the context in which they are working in the widest possible sense, and therefore reflects the importance of understanding the cultural context (Robinson-Pant & Singal, 2013; Tikly & Bond, 2013; Wynn & Williams, 2012).

My data show that the university that is the focus for the research is a hierarchical institution, and colleagues have great respect for each other and for the hierarchy (interview with Chairman, field notes). Members of the department do not judge those in authority. This is different from organisations I am familiar with, in which people are ready and willing to challenge the hierarchy, even to an outsider. This could have limited what was possible to find out by talking to people and meant that I needed sources of data beyond interviews.

A risk to the institution is that through exposing their practice, they are open to criticism. Anonymity is important, but a tension raised in CR is that the detailed consideration required of context means that the university concerned would be recognisable in Kenya. Based on my developing knowledge of the education system in Kenya, I have a huge respect for what my colleagues have achieved; the experiences they have had of education in Kenya have not prepared them for what they are being asked to do in current policy frameworks, and any judgements that I have made need to be considered within this context. In my research, I refer to work that my colleagues have published. In order to maintain anonymity, when this thesis is in the public domain, I will need to restrict how I report some of the references, so the institution and individuals cannot be recognised.

Even though I am known, the cultural norms of the institution made identifying participants problematic. My colleagues communicate with me by email, and most TEs in the university have a laptop or access to a desktop; I therefore assumed that this would be an appropriate way to make contact. I composed a message and asked one of my participants to forward it to colleagues in her department. In the event, it was not successful; TEs communicate with each other by mobile phone rather than email, and my message only precipitated replies from people I had already met. I felt very uneasy about cold-calling potential participants even though it would have been culturally acceptable to them. It felt uncomfortable within the cultural framework in which I operate, in which participants need to be free to refuse.

Overall, I was satisfied that the participants I identified would enable me to answer the research questions; I worked within the cultural norms of the institution and had not pressured people into participating, or offended anyone. In the event, the fact that they knew me and trusted me was important. The sort of reflective conversation that I was engaging them in is unusual in their culture, and although two in particular were somewhat amused by my questions, they were prepared to indulge me.

Finally, I have completed all the paperwork required by my institution concerning ethics and am adhering to the British Educational Research Association ethical guidelines (BERA, 2018). The consent form and information I provided about the study are in Appendix 2.

5.3.1.2 The consequential perspective

The **consequential** perspective encourages the researcher to think about the consequences of their research for a range of different groups: society as a whole, individuals and institutions (Stutchbury & Fox, 2009).

Consequentialism judges morality in terms of the intended outcomes. If the consequences of an action produce more benefits than disadvantages for the greatest number of people, then it is considered to be 'right'. If breaking a promise brings 'good' to a large number of people, then you are morally justified to do so. The potential consequences for this research for the wider community are positive, both in terms of helping me to be more effective in my professional role (as TESSA AD) and strengthening the voice of an under-represented group (Tikly and Bond, 2013). Educational development projects rely on public funding or charitable donations, and there is a moral imperative to make sure the money is spent wisely. The insights gained from this research could inform current and future projects, improving the OU's contribution to the field. Through publication, these insights could also benefit others and empower TEs in developing contexts.

There were consequences of being involved in this research for the participants. In order to take part in the sort of in-depth, conversational interviews that provided insights I needed, I made demands on their time. In order to manage this for some of the participants, I undertook two or three shorter interviews, giving me the advantage of being able to review my questions in the light of their initial responses. I obtained all their mobile phone numbers and communicated by text, always making sure I was on time, going to locations where they were working in order to minimise the inconvenience to them. Another potential consequence included the risk to their reputation if they felt I was being critical. I had to be very careful not to ask loaded questions which implied something about their practice which they felt they 'ought' to be doing. As the interviews proceeded, however, the positive impact of educational research became evident. They all enjoyed talking about themselves and their practice; two explicitly remarked how helpful it had been to have the opportunity to reflect in this way (and wrote some notes during the interview), and one emailed me later with further information demonstrating that he had been reflecting on my questions. The over-emphasis on the warrant to avoid harm (Bond, 2012) means this aspect of research is often ignored.

Focusing on the consequences of the research for me (as the researcher) meant, in the first instance, ensuring that I would be able to collect enough data within the constraints of full-time employment. Also, throughout the study, I have related my work to my professional practice (Burgess, Sieminski, & Arthur, 2006) and, as I demonstrate in Chapter 8, have developed my practice in line with the insights that this research has provided.

5.3.1.3 The deontological perspective

The **deontological** perspective concerns 'duty' and the way in which things are done, rather than the consequences of doing them (Seedhouse, 1998). The issues to consider include 'telling the truth' and 'minimising harm'.

Deontology is about 'doing your duty', regardless of the consequences. The notion of 'duty' is open to debate but could mean, for example, 'always keeping promises' or 'always telling the truth', the implication being that breaking promises or being dishonest will cause 'harm'. A deontologist would argue that certain actions are acceptable regardless of the consequences, because they are morally 'right'. Ethical codes and principles are built round the notion of 'avoiding harm' (Bond, 2012). However, this is problematic in qualitative research, as 'harm' could be to identity, relationships or reputation, and what constitutes harm will be different for different people. Also, participant observation inevitably involves not being completely open and honest (Robinson-Pant and Singal, 2013). As a TE, with particular interests and concerns, it was impossible for me to suspend myself from the situation I was in, but it would have been unhelpful and counter-productive to honestly reveal all that I was thinking.

In this situation, causing 'harm' could involve: taking up too much of their time, confusion about what I was doing and why, making them feel inadequate. 'Avoiding harm' involved ensuring that I had a simple, clear message about my research that my participants could relate to; carrying out my investigations as professionally as possible, making sure what I was doing was consistent with the message I had given; and feeding back in a way that was helpful and constructive for them. Four of the five participants agreed to be observed working with students. From their perspective, this was a high-risk activity and is not part of the cultural norms in this institution. So, the fact that I was obviously trusted was very important in terms of gaining access.

The length of my stay was a compromise between gathering sufficient data, not being a burden on the participant who was effectively acting as my host, and maintaining the integrity of the research by suspending my own professional persona. I found it very difficult to avoid engaging in any sort of discussion of practice; if I had been there for much longer, there would have been pressure to become involved in teaching or training, which could have impacted on the data.

5.3.1.4 The relational perspective

The **relational** perspective covers the 'core rationale' and includes issues of respect for the individual, autonomy and building trust. The 'relational' perspective reflects the importance of building constructive relationships with participants (Bond, 2012; Robinson-Pant & Singal, 2013; Tikly & Bond, 2013). Western ethical codes place a strong emphasis on informed consent as part of the warrant to avoid harm. This is not always appropriate in developing contexts (Sharmin &

Qureshi, 2013). I am confident, however, that my colleagues felt that their participation was voluntary. One participant was not keen to be observed. He did not specifically say so, he just omitted to invite me along, even though, I suspect, he knew it was what I would have liked. I respected his view by not being persistent, even though it would have enhanced the research. The position of the student teachers with whom they were working was more complex. I did not seek informed consent from them: I was not confident that they would have felt able to withdraw. Also, observation is such a crucial part of learning to teach, I did not feel that my presence in their teaching sessions was in any way exceptional or unusual.

However, being 'informed' is important and good manners. When observing micro-teaching, I always introduced myself, explained that I was not there to judge them as individuals, that I was undertaking research about teacher preparation in Africa, and gave some general feedback at the end, always congratulating them on their efforts and highlighting some specific examples which demonstrated their developing skills. The fact that the TEs trust me to represent them fairly is very important. This initial trust has arisen from our joint endeavour on TESSA SS and was enhanced, I believe, by my attention to the social trajectory (Ball, 1993) of the research.

Having worked together for a while, I believe that we are close as we can be in the post-colonial context to considering each other to be equals. Even so, a few things happened during my fieldwork that reminded me that it would be quite easy for me to disrupt that situation. Much care was required on my part to avoid demonstrating my own professional knowledge – I suspect that if I had done, it might have limited what I could find out.

Also, given my insider status (as a TE), my current role as TESSA AD, and my CR perspective, it was difficult to suspend other agendas. TESSA SS has not made the impact that I had hoped it might, and I am seeking explanations. This agenda is not something I chose to share with my participants; I think it could be disappointing for them to realise that that is how I feel – although some of them might agree – and it would have definitely impacted on what I was able to find out, maybe precipitating some defensive responses. Having multiple agendas is inevitable; how I managed this was important.

One way in which I mitigated this risk was by feeding back to interviewees in a way that affirms their practice but also provides challenge; I provided a written summary of my findings, including recommendations which could assist some of the participants in negotiating internal processes and hierarchies. Although not obviously thirsty for CPD, my colleagues are keen to learn from the TESSA network. To demonstrate my respect for them, I intend to invite them to be co-authors on a publication about the roles of TEs across cultures; and it will increase their standing within their institution.

5.3.2 Implications of ethical analysis

Four key ethical dilemmas emerge from the preceding analysis, linked to the tenets of CR. These are:

- how to talk about my research;
- maintaining anonymity;
- 'structures of agency'; and
- the impact of cultural conditions on the quality of the research.

The first arises from my desire to seek explanations. My view is that TESSA SS is not as embedded in this institution as one would have hoped, four years after the completion of the project, despite the versioning of the OERs for Kenya by this group. Although some of the participants might agree, given my position, I felt it was important to play down this view. Therefore, in talking about my research I focused on the fact that I am keen to find out about the role of TEs in this cultural setting and contribute something to the international literature about TE practice. This also had implications for how I have reported the study in this thesis. I have taken great care to express the research questions, and my findings in ways which my participants would not find disappointing, or take as a personal criticism, and have written an account of my findings specifically for them, including some recommendations for practice. This will serve to mediate the whole thesis.

The second arises from emphasis placed on the importance of context. In describing the context and drawing on documents authored by my participants, the institution, and possibly the people involved may be recognisable. I have therefore not always provided full references for their work and not provided a detailed description of the university.

The third is that the explanations I seek could involve judgements on individuals' behaviours. This dilemma manifested itself at the analysis stage. Scott (2010) includes 'structures of agency' in his typology of structures, and as I analysed the data I realised that this meant characteristics of the participants which impact on their behaviour, such as a lack of confidence, or particular ambitions. This felt intrusive, so I discounted 'structures of agency' from my analysis and only focused on causal mechanisms relevant to our work in educational development. The dilemma is that critical realism gives the opportunity for considerable depth, but how much depth is it appropriate for a self-invited outsider to expose?

A fourth dilemma concerns the impact of cultural conditions on the quality of the research. I had to make compromises around recruiting participants and what it was possible to observe, work within a time limit and not overstay my welcome. However, my judgement is that I have discovered something significant and worthwhile despite these limitations.

5.4 Data collection

During the study, I spent a week in the institution (in April 2016). I collected documents, conducted interviews, observed some teaching and had access to feedback some of my participants gave to students on their teaching. I interviewed five TEs – each one on two or three separate occasions – and the chairman of the department. I interviewed two of the participants again a year later (at a conference we were attending in August 2017), giving me some sense of the trajectory of the department and how the social structures are evolving.

I kept very detailed field notes throughout my stay. The CR perspective requires that the data can provide information about the ‘empirical’ level of reality (what is happening in this department) and the ‘actual’ level of reality (intentions of the agents, the structures and the interactions of the agents with the structures). This will enable inferences to be made about the ‘real’ level of reality, which will be examined in the light of all the data. Table 5.1 shows how the data I collected related to the research questions.

Table 5.1: The relationship between the data and research questions.

Research question	Information required	Data collected
What structures enable and constrain TEs in shaping their agency and developing their pedagogy in line with policy aspirations?	Discursive structures	Interviews, documents (lesson-planning form, lesson-observation form, departmental briefing on micro-teaching, teaching evaluation form, examination papers, students' micro-teaching, in-house journal), observations of micro-teaching (the things the students emphasised, feedback to students), field notes
	Embodied structures	Interviews, documents (course outlines, school curriculum), field notes
	Institutional structures	Interviews, field notes
	Policy aspirations	Government publications
What are the TEs' perceptions of their agency in relation to their role as a TE in this institution?	Values, beliefs and attitudes that inform their actions	Interviews, observations (micro-teaching, teaching, interactions with students), field notes
	Professional knowledge of teaching and learning	Interviews, observations (teaching, feedback to students), documents (in-house journal), field notes
	Past experiences and impact on actions	Interviews, observations of teaching
What are the underlying causal mechanisms operating in this situation which impact on the capacity of individuals to embrace pedagogic change? What causes them to be activated?		All data sources, field notes from earlier visit, interview with Bob Moon

How the actions of agents are affected by structures will depend on a number of different factors which Scott (2005, 2010) refers to as 'modes of vertexicality' (2010, p9). By this he means that different agents will interact with the same structures in different ways, and that interaction will

depend on a number of factors including the knowledge (professional and tacit) held by the agent, the flexibility (ability to resist or support change) of the structures and the opportunities for interaction and collaboration.

Interpreting Scott's modes of vertexicality in the context of this study provided a basis for thinking about what data to collect. Table 5.2 gives my interpretation of them. These provided another mechanism for checking the scope of my data, and (along with the definition of professional identity introduced in Chapter 3) informed the interview questions and the data analysis.

Table 5.2: Modes of vertexicality

Modes of vertexicality	Implications for data collection
The amount and type of knowledge held	Professional knowledge of classroom teaching, student learning, teacher learning and school science. Tacit knowledge of teaching.
The amount of resistance the structures can tolerate	The context, the impact of the curriculum (an embodied structure) and institutional structures.
The ways in which the structures enable the agents to work in new ways	The ways in which the ideas embodied in policy aspirations can be absorbed into the system – the relationship between policy aspirations and the discursive structures that prevail.
The extent to which certain consequences can spread from the interaction, beyond the individual agent	How the agents interact with each other, and if and how ideas spread within the group.

As well as data from interviews, observations and documents collected in 2016, I also had experiences, notes and photographs from earlier visits which could not be ignored, as they impacted on my understanding of the cultural context and how some of my participants work. CR recognises that social structures are 'open systems' – and therefore, as a researcher, I cannot be expected to suspend previous relevant experiences. These secondary data enhanced the study and compensated for some of the compromises mentioned above. I used them as a confirmatory tool rather than as part of the analysis for this study. Likewise, a significant consequence of my 'insiderness' was that I noticed things not said and things that are not happening. CR acknowledges that the non-occurrence of events, when one is expected or might be appropriate, may provide useful insights (Easton, 2010); and Brown (2009) goes even further, suggesting that absences can be causal and are therefore important in interpreting data. My field notes refer to things that were not said or observed that I might have expected to be.

5.4.1 Research sample and interviews

I was able to interview five TEs (all with a science specialism) and the chairman of the department. This was a purposive sample, with all participants being aware of the current policy

aspirations, three through their involvement with TESSA and two from having worked alongside them. The participants are listed in Table 5.3.

Table 5.3: The participants in the study

Name	Gender	Subject	Academic role	Years in post	Previous role	Qualification
Stephen	Male	Chemistry	Professor	27	Chemistry teacher	PhD
Paxima	Female	Physics	Senior Lecturer	7	Physics teacher	PhD
Henry	Male	Chemistry	Lecturer	20	PTTC lecturer	PhD
David	Male	Physics	Lecturer	3	Lecturer, Vocational TTC	Masters
Frank	Male	Biology	Professor	22	Diploma TTC	PhD

Although the selection of my five participants was not exactly as I had intended (as explained in section 5.4 on ethics), I felt that the range of experience that they brought to the project would be sufficient to draw conclusions.

The purpose of the interviews was to understand an individual's perspective, so I started with narrative accounts (Bruner, 1991). Bruner suggests that narrative accounts place the individual explicitly in their cultural context by highlighting particular events in sequence. Narratives allow for reflection on agency – understanding why people choose to do certain things – and can therefore provide insights into their beliefs and attitudes. For each individual, I had a number of areas I wanted to ask about in an 'active interview' (Holstein & Gubrium, 2004) (Appendix 3). This interview was informed by the definition of professional identity derived in Chapter 3 and the 'modes of vertexicality' described above (Scott, 2010). CR interviews should be theory-driven (Smith & Elgar, 2014), with the interviewer looking for evidence to confirm or falsify the theory. This means that one tactic is to provide scenarios and ask participants to comment or to reflect back to the interviewee a summary of what they seem to be saying. It also means that what is not said can be taken as evidence, which is where my 'insiderness' (being a TE myself) was helpful. Other researchers working within the CR paradigm have highlighted the challenge of trying to apply the CR philosophy within an interview situation. For example, McLachlan and Garcia (2015) tried to design a CR interview with separate questions about the 'ontological whats' and the 'epistemological hows'. However, this was not helpful; they lost sight of the 'overall immediacy

and simultaneity' (p205) of the process and reverted to what they considered to be a constructivist approach, allowing their participants to construct the 'what' during the interview process. My interviews, therefore, were loosely rather than tightly structured, included the elements suggested above and were not open-ended creative conversations that would have been inappropriate, as I was keen not to disclose too much of myself (Smith & Elgar, 2014). This is consistent with what others suggest about interviewing in a CR paradigm.

A key criticism of interviews as a way of gathering data is that the participants construct the narrative they think the interviewer wants to hear (Miller & Glassner, 2004). I believe the nature of my questioning, and the relationships already established, helped mitigate this; people were open about things that they felt they could do better, and consistent messages emerged about their working environment. I was also able to interview each person twice or three times, providing the opportunity to follow up on issues of interest and probe areas in which I felt there was more to find out.

5.4.2 Observations

I co-observed two micro-teaching sessions with my participants and one lecture. During the observations I wrote very detailed, descriptive notes (following Cohen et al., 2017) of what happened with a timeline, and supplemented and annotated the notes the same evening while the events were still fresh.

I found micro-teaching to be an effective and relatively non-threatening way to gather data. The tutor had relatively little to do, but the contributions of the students told me a great deal about the TEs – how they had prepared their students and what they considered to be important in learning to teach. The observations provided data about the social structures (discursive and embodied) (RQ1) and the actions of my participants (RQ2). I used two colours to distinguish between descriptions of what students said and did, and the feedback they received from other students and the tutor, and I took photographs of the notes that my colleague made during the observation. In the lecture, I wrote a detailed account of what was happening. In both cases, I interviewed my participant afterwards about their interpretation of what we had both observed. I found this a valuable way of accessing their views on teaching and learning eliciting what they had done and why they had done it.

It has been suggested that observation can be a form of collaboration, involving the participants in a dialogic relationship with researcher (Angrosino, 2005), thus contributing to the social trajectory of the research (Ball, 1993). This was certainly my experience, and it was interesting to hear about individual students, which, although not directly relevant to the research questions, contributed to my understanding of the context.

5.4.3 Documents

I was able to collect a range of documents pertaining to the course, to teaching in the department, and to the policy environment. Different documents had different purposes. Table 5.4 shows how the documents I analysed relate to the research questions.

Table 5.4: Documentary sources of data

Document	Why is this document useful?	Specific contribution to the research
Policy statements and quality assessments from the Ministry of Education in Kenya	To understand the policy context	A thorough understanding of policy aspirations driving change. Evidence of how pedagogic change is conceptualised in Kenya.
The university catalogue	Describes the offering by this institution	To understand where teacher education fits into the institution
Course outlines	Indicates what this group thinks pre-service teachers of science need to know in order to be effective	To understand the discursive and embodied structures (RQ1)
Departmental briefing notes on micro-teaching	Shows how this group thinks students learn to teach	To understand the discursive structures (RQ1)
Two examination papers and some student responses to one of them	Indicates which knowledge is valued as being important in learning to teach	To understand the discursive structures (RQ1)
The forms used by supervisors when they visit students on teaching practice, and the evaluation form given to students to comment on the quality of the teaching they receive	Embodies the institutional view of what constitutes effective teaching	To understand the discursive structures and institutional structures (how lecturer performance is measured) (RQ1)
An evaluation form given to teaching-practice supervisors to find out about the quality of student teachers' teaching	Reflects an aspiration for effective teaching	Provides insights into the thinking of one of my participants (she commissioned the questionnaire) and the discursive structures (RQ1 and RQ2)

Research papers written by my participants	Highlight their own priorities and their professional knowledge	Provides insights into how my participants think about teaching and how it might be improved (RQ2)
The university journal, which is published each year containing papers from supervisors and students based on Masters and PhD studies	Provides an overview of the sort of research taking place in this department	Provides insights into the collective view of how they think about teaching (discursive structures – RQ1)
A course book on teaching chemistry written by one of my participants and issued to pre-service teachers	Indicates how the author thinks people learn to teach chemistry and the professional knowledge that they need	Provides insights about how this individual understands teaching and learning, and learning to teach (RQ2). Also insights into the discursive structures (RQ1), as he is highly respected by others, and this book is on the reading list.
Agenda for a departmental meeting	Provides an example of how the department processes are organised	Provides insights into the institutional structures (RQ1)
The school science syllabus	Shows how science knowledge is presented	Provides information on an embodied structure (RQ1)

These documents contributed to my understanding of the discursive, embodied and institutional structures; and, in some cases, how the author thinks about teaching and learning, including the professional knowledge that is valued.

Before explaining how these data were analysed, I will summarise how I believe the research design and data collection methods ensured that the research was of sufficient quality and, in particular, how I thought about the issues of reliability and validity.

5.5 Research quality

The explicit positioning of this study within a CR paradigm has enabled me to link paradigm, methodology, methods and analysis, thus giving coherence to this qualitative study (Hammersley, 2007). The challenge was that I had to interpret the tenets of CR for my context as there are relatively few studies in the field of education set within this paradigm to use as a model. This study is therefore experimental in a sense, and provided the opportunity to evaluate the paradigm. The rigour of the study is ensured by my:

- recognising the implications of my position and exercising critical reflexivity (McNess et al., 2015; Savvides et al., 2014);

- undertaking a detailed ethical analysis, acknowledging methodological compromises and taking action to compensate for these (Stutchbury & Fox, 2009);
- choosing a context with which I am already familiar in order to ensure a strong social trajectory (Ball, 1993);
- drawing on examples from other disciplines in order to understand the practical implications of research in a CR paradigm (Bygstad et al., 2016; Fletcher, 2016; Tao, 2013);

and, as will be demonstrated in the next two chapters,

- ensuring that the cognitive path from empirical data to conclusions is clear and recoverable (Avenier & Thomas, 2015);
- taking a critical view of any proposed explanation, acknowledging that social theory is fallible and multiple explanations are possible (Brown, 2009; Bygstad et al., 2016; Fletcher, 2016).

I have been explicit in how I have drawn on the tenets of CR and, in particular, how I have interpreted the concept of 'social structure'. The concept of vertexicality (the factors affecting the relationship between structure and agency) provided guidance which contributed the interview schedules and how I saw the purpose of the different documents. I believe this has ensured the reliability and validity of the research. These are problematic concepts in the context of qualitative research (Seale, 1999) and clarity about how they are construed (Perakyla, 2004) is important.

5.5.1 Reliability and validity

Reliability concerns the extent to which findings can be replicated (Cohen et al., 2017). This relies on obtaining clear recordings and transcriptions, keeping detailed notes and having multiple sources of data. During fieldwork, I kept notes at multiple levels, each evening reflecting on my notes from the day, reviewing interview schedules for individuals, and using 'memoing' (Miles & Huberman, 1994) to keep track of developing concepts. Afterwards, I went over the data many times and represented it in numerous different ways. Even so, I cannot be confident that I would reach the same conclusions if I come back to the data in a few years' time, as I will have gathered new experiences and will be coming at it from a new perspective. However, I will be able to trace a route through the analysis process and identify any differences. Provided excessive claims are not made, this does not make the research unreliable.

Validity concerns the extent to which the data support the claims. Words like 'trustworthiness', 'believable' and 'authentic' are possibly more relevant in the context of qualitative research. Using Cohen et al.'s (2017) identification of different types of validity, my aim is to achieve internal validity (through multiple sources of data, low-inference descriptors for coding, checking

with TESSA colleagues); content validity (by linking the instruments to the research questions, the literature and the theoretical framework); concurrent validity (by looking for links between the observation data and interview data); and external validity (by demonstrating 'totalisation' and generalisation within the context of the TESSA programme). 'Totalisation' (Baszanger & Dodier, 2004) 'integrates the different observation sequences into a global referential framework' (p13). The 'global referential' framework in this case is the theories about teaching and learning set out in Chapter 4. In the context of an EdD, with the emphasis on developing professional knowledge which impacts on professional practice (Burgess et al., 2006), and in my role as TESSA AD, the insights obtained will inform my continuing work with TEs in Africa. Any conclusions, provided the process of reaching them is explicit and recoverable (Checkland & Holwell, 1998), while not being completely generalisable, will be relevant within the wider context of the TESSA programme.

5.6 Data analysis

In order to devise a process for analysing data, and hence attempt to establish the prospect of TEs being agents of pedagogic change, I looked for other studies taking a CR perspective. Very few of these are in the field of education, but they yielded some helpful ideas on which to base my analysis (Bygstad et al., 2016; Davis, 2013; Fletcher, 2016; Tao, 2013; Wynn & Williams, 2012). Most of the studies used some sort of coding scheme, combined with the abduction and retrodution.

'Abduction seeks to interpret and re-contextualise individual phenomena within a contextual framework or a set of ideas in a way that seeks to elucidate underlying structures and causal mechanisms' (Tikly, 2015, p257). It involves looking for potential explanatory patterns and is the first step in developing theory (Åsvoll, 2014). Retrodution involves inference – identifying the mechanisms that could explain the outcomes (or in this case the prospects for pedagogic change) and testing them against the evidence, through higher-order coding and cross-case analysis (Bygstad et al., 2016; Wynn & Williams, 2012). Thus it can be considered to be 'a distinctive form of inference...which posits that events are explained through identifying and hypothesising causal powers and mechanisms that can produce them' (Hu, 2018, p122). The scheme that I devised combined some of the general principles of qualitative data analysis with the requirements of a CR framework. It took me a while to work out this approach, but a number of false starts proved to be important in retrospect, as they enabled me to become very familiar with the data.

5.6.1 Getting started

My first concern was to organise data from multiple sources and to undertake what is often termed 'data reduction' (Miles & Huberman, 1994). I converted my transcribed interview data into text files, imported them into Microsoft Excel and became very familiar with my participants' responses as I read and re-read them, trying to work out how I might code the data. I also

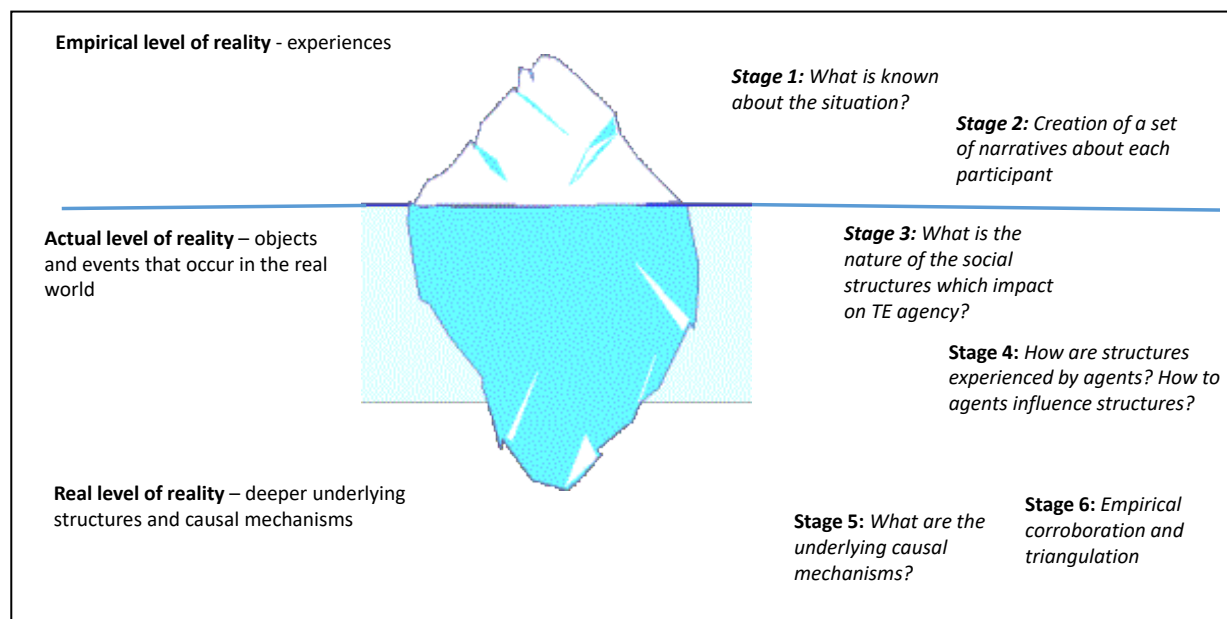
repeatedly listened to the recordings. Initially, I was looking for ways to code the data and look for themes, but I began to realise that my CR research design required a different approach, which is described below.

I was also keen to try some form of Computer-Aided Qualitative Data-Analysis Software (CAQDAS), not because it has any conceptual advantage over a manual process (Coffey et al., 2010) but because the EdD can be seen as a research training, and one of my personal objectives was to explore the opportunities afforded by technology with a view to making use of it (or not) in the future. I chose Dedoose – a web-based package – on a colleague’s recommendation, and it proved to be extremely helpful, facilitating the storage, retrieval and sorting of data. I was able to identify excerpts from the narratives on each theme and collect them together in one spreadsheet. I did not make full use of the functionality, as Dedoose is designed to aid mixed-methods data analysis, but I envisage working with this sort of data in the future on different projects, so it has been a helpful exercise.

5.6.2 Data analysis in a critical-realist paradigm

The process of data analysis that I used takes a holistic view of the data; it is theory-driven and makes explicit use of the processes of abduction and retroduction in order to identify the underlying causal mechanisms which explain the observed experiences. I tackled the data in terms of the stratified view of reality set out in Chapter 3, namely that reality can be conceptualised in terms of three layers: the **empirical** (observable and measurable); the **actual** (accessible through interviews and observations) and the **real** (the underlying causal mechanisms which give rise to the observable events) (Tikly, 2015). I devised a six-stage process, drawing on Bygstad et al. (2016) and Wynn and Williams (2012). In stages 1 and 2, I identified what can be taken to be known about the situation (empirical level of reality). In stages 3 and 4, I focused on structure and agency. In stage 3, I looked for evidence of the nature of the embodied, discursive and institutional structures. In stage 4, I synthesised what I knew about each participant and their relationship with the structures (abduction). In stage 5, I made inferences to identify the underlying causal mechanisms which I believe give rise to the observations at the empirical level of reality, and in stage 6 I checked my conclusions, considering alternative explanations. This is summarised in Figure 5.2.

Figure 5.2: The link between the three levels of reality and the data-analysis process



Stage 1: What is known about this situation?

I started by setting out what I think can claim to be known about this situation (the empirical layer). In a mixed-methods study, this would include quantitative data. In a qualitative study, it is less clear what constitutes the empirical level; and there is variation between the studies I have found. In a study of why teachers are absent, Tao (2013), bypassed the empirical layer, pointing out that it is effectively the statement of the problem. Applying this idea to my situation, at the empirical level of analysis, I identified the aspects of the context that are relevant to the problem, and where I suspected that further analysis (as I delved into the 'actual' layer of reality) would reveal disconnections. This involved analysing Government documentation in order to understand how pedagogic change is conceptualised in Kenya. In practice, this was an iterative process, although here it is presented linearly.

Stage 2: The creation of a set of narratives about each participant

I brought together data from multiple sources by writing a detailed description – which I am calling a professional narrative – of each participant, incorporating quotes from all their interviews, relevant details from my field notes, observation data, documents that provided further evidence about the things they talked about, and examples of their research outputs. My starting point was the interview and, as I drew on text from the interview, I highlighted it in the spreadsheet. I was careful to select sections that were relevant to my research questions; and, when I had finished the narrative account, I checked all the data which were not highlighted to ensure that I had not missed anything that might be significant. This had the effect of combining my data in a holistic way and reducing them to a manageable form. Some of the narratives were

long – up to 20 pages – and are purely descriptive. Writing them was a very powerful experience. By the end of each one, I felt as if the person had been sitting next to me, and I was thoroughly immersed in my data. I also created a narrative about the department, drawing on my field notes and departmental documents. There were some documents that were not incorporated into the narratives, so I analysed these separately, as set out in Table 5.5.

Table 5.5: Document analysis

Documents	How I analysed them	What they told me about
Criteria for judging teaching – TP observation form, criteria in the micro-teaching notes and students' evaluation of lecturers	Schweisfurth's (2013) minimum criteria for learner-centred teaching and induction	Discursive structure – what constitutes effective teaching
Examination papers	Whether the questions were testing knowledge or understanding; how subject is represented	Discursive structure – what knowledge about teaching is valued
Course outlines	Topics taught and time spent on them	Discursive structure – what knowledge about teaching is valued
<i>Teaching Chemistry</i> course book	The number of pages devoted to different topics	Discursive structure – what knowledge about teaching is considered important; how the author thinks about learning to teach
Journal articles by participants and from the department	Research paradigms used	Discursive structures – the nature of knowledge about teaching

I imported the five narratives and my analyses of the documents into Dedoose software for stage 3 (see Appendix 4 for one professional narrative and Appendix 5 for my analysis of how teaching is assessed).

Stages 1 and 2 constitute what Bygstad et al. (2016) call the 'explication of events'. The narratives provide a 'thick' description (Freeman, 2014), which describes the participant within their context.

Stage 3: What are the social structures that impact on teacher-educator pedagogy? (RQ1)

Using Scott's (2010) typology of structures, I examined the narratives and the other documents for evidence about each structure type, in order to determine the nature of that structure in this context. I used the three types of social structure identified by Scott that are relevant to the problem: discursive (the ideas that underpin the work of the individuals in this situation); embodied (aspects of the situation which restrain); and institutional and systemic structures.

Within Dedoose, I identified excerpts of each narrative that provided evidence about the nature of the particular social structure with the aim of being able to describe them in this context. It was possible to 'code' each excerpt against more than one structure type, and to create sub-codes about the structure. I was able to collate all the excerpts relating to 'discursive structures', for example, and build up a picture of the ideas about teaching and learning which underpin the work of this group. By creating 'sub-codes' as I went along, I was being driven by the theory (Scott's typology (2010) for social structures) but was allowing the data to guide me as to the nature of these structures. My sub-codes (Appendix 6) were influenced by my definition of professional identity in Chapter 3 and the theories described in Chapter 4, and inevitably, my own position as a TE.

As I worked through the narratives, I used 'memos' to highlight anything else of interest. For example, building pedagogical content knowledge is an important aspect of learning to teach science (Loughran et al., 2004), so I was interested to find out if and how it manifests itself, and my participants' view of what it is and how significant it is. This was often an example of 'coding by absence' (Rosiek & Heffernan, 2014), and the memo facility was a helpful way to track my thoughts on such issues.

Another category which emerged was 'contradictions'. As I considered each narrative with respect to structure and agency, a number of obvious contradictions manifested themselves. Subsequently, however, I came to see these as 'disconnections' rather than contradictions. These became the 'events' (in the 'actual' layer of reality) that I needed to explain.

Stage 4: How are structures experienced by agents, and how do agents influence structures? (RQ2)

As I analysed the narrative, I created a set of memos about 'agency', identifying things that they felt they could and could not achieve, and evidence of how they interact with the structures. I produced a vignette of each participant, characterising each one. This was the abduction stage of the process, as I moved beyond the thick description to interpret their behaviour with respect to the social structures, taking account of all the data. Each vignette highlighted how that individual interacted with the social structures. Looking across the vignettes, the causal mechanisms emerged.

Stage 5: Identifying the underlying causal mechanisms (RQ3)

This is the stage of the process called 'retroduction', where inferences are made based on the higher-order coding and cross-case analysis (Bygstad et al., 2016). To do this, I focused on the memos I had generated in stages 3 and 4. Causal mechanisms give rise to 'events' (in the actual layer) and 'experiences' (in the empirical layer). There were many possibilities at this stage, so I focused very clearly on the research questions and identified causal mechanisms relevant to

pedagogic change, but also relevant to the work of an outsider and my role as TESSA AD, that might apply in other similar contexts.

Stage 6: Empirical corroboration and triangulation

Having identified two important causal mechanisms, I went back through the data, looking for evidence to substantiate my claims. CR asks us to consider alternative explanations and be highly critical of the theory we propose. In my case, the focus on professional practice limited the choice of relevant causal mechanisms. Within the CR paradigm, we are not necessarily looking for repeated confirmations of an event (triangulation), rather the potential to abstract a clearer understanding of the causal factors and relationships (Bygstad et al., 2016). In this study, therefore, this stage involved examining the data very carefully, making sure that there was evidence for the chosen mechanisms across the data set, and considering the extent to which they explained the contradictions identified in Stage 3.

I have described the data analysis process as a set of clear steps. However, reaching this stage was challenging, particularly as much of the literature on qualitative analysis (e.g. Braun & Clarke, 2006) focuses on various approaches to thematic coding. In this scheme, I have avoided fragmentation and decontextualisation of the data (Augustine, 2014; St Pierre and Jackson, 2014) and taken account of absences (Rosiek & Heffernan, 2014).

5.7 Summary

This was small-scale qualitative study, drawing on ethnographic methods, involving engagement with five TEs in a university setting. All of them were familiar with current policy aspirations through their involvement (direct or indirect) with TESSA. As a result of being known in the context, I was able to visit their institution as a researcher. I collected documents, carried out interviews and observed four TEs in their work with students. Data from a previous visit served to triangulate the data gathered in the study and to add to my knowledge of the context.

The intensive nature of this CR study created some ethical dilemmas, especially around the elucidation of 'structures of agency'. My investigation of the social structures was therefore limited to discursive, embodied and institutional structures.

I devised a process for analysing data which is consistent with the tenets of CR in that it takes a holistic approach to the data (through the construction of professional narratives) and is theory-driven. The findings are described in Chapter 6.

6. Findings

The findings are presented in terms of the three levels of ‘reality’ that underpin critical realism: empirical, actual and real (see Figure 5.2, Chapter 5) (Wynn & Williams, 2012).

The ‘empirical’ level is what is known about the situation (experiences). For this level, I present the aspects of the situation that led to this study, an interpretation of the policy context and relevant factual information about the university and my participants. These findings provided a context for the research questions, and highlighted avenues to follow, rather than contributing directly to them.

The ‘actual’ level of reality includes an account of the social structures which seem to impact on the work on this group of teacher educators (RQ1); and an account of their perceived ‘agency’ with respect to their role as a TE (RQ2). It is at this level that the social structures interact, enabling and constraining my participants, and a number of disconnections (or, in CR terms, ‘events’) emerged.

The ‘real’ level of reality is where I present the causal mechanisms (explanations for the ‘events’) that are relevant to my problem alongside the evidence that led to these conclusions (RQ3).

6.1 The empirical level: what is this situation like?

In a mixed methods study, the empirical level of analysis includes data which can be presented as objective ‘fact’. In a qualitative study such as this, what to include in this level of analysis is less clear. I chose to identify aspects of the situation that would be difficult to contest, and which were relevant to the study. Here, I consider what needs to change, and what can be considered to be known about the department and my participants.

6.1.1 What needs to change?

In order to examine the prospects for pedagogic change, I needed to understand the policy context which was driving the need for change, and the nature of the changes required. As explained in Chapter 2, ‘Unlocking the future potential for Kenya: The vision 2030’ (Ndung’u et al., 2009) sets out a vision for an education system that is inclusive and has a relevant curriculum which fosters social responsibility, enhances moral and ethical values, and increases literacy. The subsequent Draft Policy Framework (MoE and MoHEST, 2012) elaborates on this, specifically mentions learner-centred education (LCE) and refers to the need to change teaching and learning processes in schools to produce better outcomes for students. The final version was published online in 2016 when I had completed my data collection (MoE and MoHEST, 2015). Given the global interest in the sort of active pedagogies associated with LCE (Schweisfurth, 2013; Westbrook et al., 2014), and the explicit mention of LCE in the Draft Policy Framework (MoE and

MoHEST, 2012), I analysed the draft policy frameworks and the final version, using Schweisfurth's minimum requirements for LCE.

I was able to identify 25 excerpts from the Draft Policy Framework (2012) exemplifying six of the eight 'minimum standards'. The National Curriculum Policy (2015) does not specifically mention LCE, but I was able to identify 23 excerpts linked to the minimum standards. The aspect that is missing from the later (and much shorter) document is reference to the relationships between teachers and learners. The two criteria not mentioned in either document are those associated with classroom pedagogy, which we would perhaps not expect to be part of a high-level policy statement. I concluded that Government policy is consistent with LCE, although how that translates to classroom pedagogy was not specified. (At the time of the study, new school curricula were not available). Table 6.1 provides some examples from this analysis.

Table 6.1: Examples from the analysis of Government policy documents

Criteria for LCE	Excerpt from Draft Policy Framework (2012) / Policy Framework (2015)
Relevant school curriculum	Given this capacity, it is prudent for all counties to contribute to curriculum content. For example, those along Lake Victoria may want to include fishing and fishing-supporting systems in their curriculum. The nomadic communities may wish to include subjects on nomadic lifestyles and how to modernise and improve their living standards. (2015, p30)
A curriculum which engages learners	The highlights of these policies include the provision of free and compulsory basic education that is reformed to inculcate interest and skills in science, technology and innovation as well as environmental concerns for a vibrant economy. (2015, p9)
Inclusion	That the curriculum will be competence-based in order to assure the desired outcomes at each level which would facilitate progression of learners with diverse interests and abilities. (2015, p11)
Relationships between teachers and learners	... changing instructional practices towards greater collaborative relationships between teachers and learners. (2012, p61)
Focus on a range of skills and competences	Enhance pedagogical approaches that support creativity, innovation, critical thinking and sustainable development (2015, p18)
Meaningful assessment	Develop more complete, and fair, learner-evaluation processes, focusing on both cognitive and non-cognitive attributes (different domains), with fair balance between formative and summative assessments, considering both assessment of and assessment for learning. (2015, p19)

The purpose of this analysis is to highlight the nature of the policy context. It provided some context to inform my elaboration of the social structures (RQ1) and, in particular, the discursive structures (the ideas that underpin the activities of the agents).

The National Education Sector plan (MoE and MoHEST, 2014) states that

‘The Government recognizes the need for a better-integrated and harmonized system of pre-service and in-service teacher education, if the quality and effectiveness of the teacher education service is to improve’ (p73).

This manifests itself in the policy (2015) as a commitment to

‘reform pre-service teacher education training curricula’

and to

‘build capacity for teacher trainers to enable them to impart knowledge, skills, values and attitudes for implementation of the reformed curriculum’ (p18).

The evidence from these documents is that teacher education in Kenya is under scrutiny and is likely to be more regulated in the future through the provision of a national teacher education policy (p18, 2015).

Therefore, the empirical finding relevant to this study is that:

- Pedagogic change (in particular the ideas associated with LCE) is part of the policy context.

6.1.2 The department and the participants

Drawing on the evidence from interviews, observations and field notes, I compiled a description of the department (Appendix 7), which informed my analysis of the institutional structures. Using this, I identified a number of empirical findings (ones which did not require interpretation or analysis) which are relevant to my study. These findings are:

- the department has a good reputation in the local area. Their student teachers easily get employment and are considered to be well-qualified, effective teachers; and
- research is taken very seriously in this institution, with promotion depending mainly on publications rather than teaching performance.

The second finding is relevant because it concerns the perceived quality of teachers produced and is linked to the ideas that my participants hold about effective teaching. The third is relevant because the tension between being a teacher and a researcher is well known in the context of teacher education (Murray & Czerniawski, 2011; Murray & Male, 2005; White, 2014).

Both findings provide context for understanding the discursive structures (ideas about how to assess teaching), institutional structures (the importance of research) and the behaviours of my participants (their confidence in the course design and their personal priorities).

My participants (Table 5.3, Chapter 5) are all working with pre-service secondary science teachers. They all teach methodology courses rather than science subject knowledge (that takes place in the physics, chemistry and biology departments), but they all identify strongly as scientists, often drawing on their subject disciplines for examples. The evidence for this came from the interviews, and from behaviours observed on both visits. Therefore a fourth empirical finding, relevant to the study, is that

- All the participants identify strongly with a science discipline.

This is relevant because it highlighted pedagogical content knowledge as potentially important in the discursive structures.

6.1.3 Summary

From this analysis, I have confirmed that the quality of teacher education is currently under scrutiny by Government and have identified four other empirical findings which provide a steer about some of the things to look for in order to understand the structures and the actions of my participants.

These findings (stage 1 of the analysis), alongside the professional narratives that I produced for each participant (stage 2 – see Appendix 4 for an example), summarise what I believe can be known about this situation from my data (the empirical layer of reality). Minimal interpretation was involved – I have simply identified information that I believe is relevant to the next layer of analysis. As I will demonstrate, when I analysed the data further in order to understand the social structures and how my participants interact with the social structures (the actual layer of reality), disconnections emerged. It was attempting to explain these disconnections that led me to the underlying causal mechanisms (real level of reality). I use the word ‘disconnections’ because each empirical finding had implications for structure and agency. However, the things I expected to find, given these empirical findings, were not always evident, or manifested themselves in unexpected ways.

6.2 The actual level: what are the events that inform this situation?

In this section, I will outline what I have found out about the social structures (RQ1). I will also describe, through a process of ‘abduction’ (theoretical re-interpretation of the data), the impact of the social structures on the agency of individuals and how their actions have the potential to change social structures (RQ2). Finally, I will identify four disconnections linked to the four findings from the empirical layer discussed above.

6.2.1 What are the social structures that impact on the work of these teacher educators?

In order to identify the social structures, I have been guided by Scott's (2010) typology. I looked across the data for evidence about how the embodied structures (those which are fixed and dictate day-to-day activity), the discursive structures (the framework of ideas that underpin the activities of the agents) and the institutional and systemic structures (those which impact on the relationships between actors as they take action in the setting) manifest themselves in this context.

6.2.1.1 Embodied structures

The embodied structures that I identified were associated with the TE course and school curricula and included the course outlines, guidelines for assessing teaching, and examination papers. I also identified a number of cultural norms which effectively 'prevent people from being in a different place from where they are at present' (Scott, 2015, p97). These structures are inflexible, but are important in the context of pedagogic change. They are: the curriculum, ideas about how to assess teaching, examination papers and cultural norms.

Curriculum

The course outlines provided are not detailed, and most of the collaboration that takes place involves discussions about how to divide up the work between the people teaching the course (Paxima and David interviews). The coverage of key aspects of teaching is superficial, as evidenced by the fact that there is just three hours for:

'Teaching strategies applied in Physics at secondary school. Inductive and deductive reasoning. Lecture, questioning, demonstration, class experiment, fieldwork and project methods'. (Physics course outline, Jan–April 2016)

What is most significant perhaps is what is missing from these documents. Student teachers do not have sessions on how to teach particular ideas in their subject, formative assessment or how to organise practical work. However, they do cover a number of topics such as 'different syllabus involving physics established in Kenya since independence' which aren't directly related to classroom teaching. This is consistent with what I was told by David:

'So all we do is ... first of all increase the theoretical understanding of things and how teaching goes on ... the idea here is to help them get the correct impression of teaching, in terms of the whole spectrum of planning.' (David interview)

He also reminded me that the Teaching Service Commission lays down certain guidelines and insists that, in order to qualify, teachers have to have studied the sociology, psychology and philosophy of education, but did acknowledge that the methods course was 'probably not

addressing the things we want’ and admitted that his students want him to teach them more about how to teach physics rather than focus on general methods.

Micro-teaching is part of the curriculum and takes place on two separate occasions. Working in groups of 20, each student has the opportunity to give a 10–20-minute ‘lesson’ to the others. A micro-teaching guide sets out the expectation that seven skills will be practised in the first session, with the integration of several skills in the second, longer session. There was much emphasis in the micro-teaching sessions on setting the lesson plan out in the prescribed manner (field notes) and comments related to whether the various aspects of the plan were in the correct box and whether the student actually did what they had set out in the plan.

All my participants are very familiar with the secondary school curriculum in their subject and, indeed, carry a copy of it (Paxima interview and field notes). They pride themselves on the fact that their course is closely linked to this curriculum and use examples in their teaching, although, as David and my observation of a teaching session suggested, they could do more of this. If significant changes are made to the school curriculum, then this will impact on this department.

Ideas about how to assess teaching

In Kenya, no national teaching standards exist, but I came across four departmental documents which set out how teaching should be assessed. I analysed these from the perspective of LCE, looking for evidence of Schweisfurth’s ‘minimum criteria’ (2013) (see Table 6.2). I considered this analysis to be appropriate in the context of the empirical finding that the policy context is asking for more emphasis on LCE (see Appendix 5).

Table 6.2: How four documents used to assess teaching demonstrate the principles of LCE.

Document	No. of criteria	No. which were learner-centred	Example of learner-centred criteria
Teacher trainee appraisal guide (for micro-teaching)	21	12	‘are they motivated’; ‘are all pupils involved in the lesson?’; ‘is learner level of interest kept high?’; ‘include all of them in the lesson?’
Teaching practice (TP) assessment form	25	6	‘Interaction friendly, encouraging, approachable’; ‘sensitivity to class needs and class environment’
Teaching practice (TP) evaluation questionnaire	25	4	‘learners’ responses were positively reinforced’; ‘was sensitive to the needs of the class’
Teaching effectiveness evaluation form (for students of lecturers)	25	6	‘uses relevant examples/illustrations to explain principles and concepts’

The most 'learner-centred' set of criteria are the ones which are not actually used for formal assessment. They are part of a 'guide to micro-teaching', but I did not see them being used, and micro-teaching is not formally marked (Paxima interview).

Less than a third of the criteria reflect LCE values, and of the others I identified three categories into which they would fit:

1. The rules that the teacher should follow
2. Getting through the content as set out in the plan
3. Mastery of subject knowledge.

These covered the majority of the criteria on each document, and the idea of a set of rules that students learn to follow is consistent with the fact that learning to teach is conceptualised as a set of steps to be mastered one by one (see 'discursive structures' below).

A striking feature of these criteria is that the vast majority can be checked by simply observing the teacher and not the learners.

Examination papers

I analysed three examination papers in order to identify the type of knowledge that is considered to be important. This analysis is in Appendix 8. The emphasis was on recall, and my conclusion was that being able to answer the questions posed did not necessarily equate with being a good teacher. There has been a move in recent years to allocate 30% of the marks for the year to coursework, but in practice 'coursework' is a short test (field notes), and, as the groups have got larger, the tests have become shorter in response to the marking load they generate (evidence from tests, 2014 and 2016). Although the examination represents 70% of the final mark and coursework represents 30%, students have to pass TP in order to pass the course. This involves being observed and marked against the criteria above, but also preparing a teaching resource, which they subsequently donate to the school where they did TP (field notes). This indicates an aspiration to broaden the range of skills that form the final assessment.

Cultural attitudes and social norms

During the interviews, I identified a number of cultural attitudes which impact on the agency of TEs with respect to pedagogic change, and are therefore part of the embodied structures. These attitudes impact on the nature of the relationships in the department and therefore on the prospects for pedagogic change. The first concerns age: older people are held in great respect in Kenyan society, and Paxima was very clear that she is able to influence younger members of the department, but not people with more experience than her. This is perhaps exacerbated by the fact that Education departments generally employ people directly from school, or from teaching colleges; they are expected to study for a masters and a PhD and are supervised by colleagues

‘By the time I came in I was doing my PhD, so I was under them. So it was a bit, you felt a bit intimidated, you know.’ (Paxima)

She went on to describe how she has been coaching a younger colleague in how to use group work with large groups of student teachers.

‘It’s easier to handle the younger ones, because these ones are older, they tell you: I taught you, now how can you come to teach me? They are a bit difficult to, to handle really.

But I have two categories of lecturers. We have those who are now the old professors, who think that ... They, they are very resistant to change ... But there is this now upcoming team, who are IT-compliant.’ (Paxima)

David also suspects that the older, established, lecturers are challenged by their younger colleagues:

‘I think there could be a sense of fear, also ... That these other guys have come in with the latest understandings of things and they’re rattling the, the general understanding of things.’ (David)

He went on to explain his experiences of trying to get some of his TE colleagues to embrace technology:

‘But you see now the problem with teacher educators ... if they’ve been having practices of doing things the old way, shifting them to the current way of doing things takes a long time. This is because [Laughs] These people will earn their salaries either way ... Because they have taught their class ... You can’t come tell me that because you’ve not used technology and it looks like your subject requires ... They’ll say: No, you don’t know my subject. And then there’s also the comfort zone. This is the way I usually do it ... So I’m not moving a step forward or backward. This is the way it is.’ (David)

The perspective of Stephen was that, as a result of having supervised many of his colleagues, the fact he is held in great esteem is not necessarily to be celebrated:

‘I supervised many of them, the chemists who are here, even physicists. We have core supervised with my colleagues ... and they’re doing well. So the only thing when you go now to a departmental meeting, we look like we are the, the godfathers ... you don’t know when to speak because you may say something that it becomes the truth, the gospel truth ... you know, you have an idea, which you want people to challenge or to, or to, to contribute in, but [laughs] because of the evaluation that this was my supervisor, this was my, my mentor, when he says it, he has said it, I can’t talk. So that becomes a bit of a challenge. So you have to keep prodding people to, to come out and say their views. That we are now, we are equals.’ (Stephen)

David suggested why this was the case:

‘Our society is er, er, a bit condescending I would call it, especially for the younger people ... Condescending in the sense that students will come almost kneeling. I mean, they, too much respect and ... it’s the way our learning system is.’ (David)

A second cultural attitude highlighted by Frank is the attitude to evaluation and criticism. The department is trying to create a culture of continuous improvement by asking students to evaluate lecturers. Receiving negative criticism in these evaluations is proving to be challenging for some:

‘They give some out. And after they have collected, they look at the comments the students have made. Those which are very negative they remove.’ (Frank)

This sort of behaviour makes the prospects for pedagogic change more difficult; if TEs are reluctant to analyse their teaching and reflect honestly on what does not work, they will have little incentive to try new approaches.

The final cultural attitude that seems to reduce the prospect for change results from the examination culture. The examination mainly tests the recall of ‘knowledge for practice’ (Cochran-Smith & Lytle, 1999), much of which is not related to practice. When student teachers from this department go into schools, they are appreciated and offered jobs:

‘...our students I would say are very clever out there. We have so many universities, but when we take them for placement, for TP, they are marketable ... most of the schools pick them up.’ (Henry)

I heard similar statements from others; this is considered to be a successful course, so there is little incentive to change.

6.2.1.2 Discursive structures

The discursive structures (the ideas that underpin the work of the group) are perhaps the most important in terms of the prospects for pedagogic change, as these are flexible. As explained in Chapter 4, successful changes in behaviour are underpinned by ‘cognitive participation’ (May & Finch, 2009), which means examining the ideas that underpin the activities of a group is important in supporting change. The ideas that are relevant here are ideas about student learning and effective teaching, and attitudes to teachers and schools. The data revealed some consensus around what constitutes effective teaching, but not about how teachers learn, beyond following the course and telling students what they should be doing.

‘So when I say I train teachers then I, I, I, I, I, I, I teach them how to teach. And teaching them how to teach is to look at the kind of methods that are followed, the resources that they may require and proper planning preparation, yeah. That is telling somebody how to teach. You have good preparation, you can get resources and you have the right appropriate methods to deliver, yeah’. (Henry)

The evidence suggests that ideas about teacher learning are still emerging in this department. There was some acknowledgement that reflection is important, but the evidence from the micro-teaching is that it is not well-developed (field notes).

Ideas about effective student learning

My participants presented a consistent view that school students learn science through active engagement. David talked about applying the principle of 'hearing, seeing, doing' to all his teaching, and Henry and Stephen talked about the importance of practical work:

'In my view when students do the experiments themselves, I think both ways, acquisition of knowledge, acquisition of processes in my view is better ... they construct that knowledge themselves. And that is the view of our Jerome Bruner.' (Stephen)

'... you give them practical exercises on what you are teaching, then they will learn the skills and they will learn the knowledge.' (Henry)

Doing practical work is deemed to be 'learner-centred' and is at the heart of constructivist approaches to learning science.

'...if you are in a position to harness or to find out what they already have and then when you bring what you have, they will be able to move to construct meaning.' (Henry)

Stephen talked specifically about what he called the 'inductive approach' to learning science in which the teacher creates opportunities to observe phenomena, which students then try to explain (as opposed to explaining the theory and then illustrating the ideas with experiments).

In the micro-teaching, students had obviously been encouraged to bring or create a learning resource, and were congratulated on doing so (field notes). In the lecture, there was a short interactive activity in which students were asked to write a chemical equation. However, the focus of this activity was the correct answer rather than any of the misconceptions it revealed, how they might tackle such misconceptions with a class of school students (field notes), or how to use this idea in their own teaching.

The data also suggest that working in groups is considered to be important to support student learning. Stephen developed what he referred to as the 'Co-operative Class Experiment Teaching Method' (CCETM) as part of his PhD, and Frank talked about 'Co-operative Concept Mapping' (CCM). Both completed positivist studies in which they concluded that taking part in group work improved learning.

Ideas about effective teaching

A consistent picture emerged across the five participants about what constitutes effective teaching, with them emphasising active pedagogy, structured lessons, relationships, professionalism and following certain rules.

Effective teaching is seen as 'active teaching', with one remarking that:

'...you cannot say that learning has taken place when all you do is lecture' (David),

and another explaining that:

‘...my job is to set up experiences for learners to go through ... Yeah, so that they can interact and of course construct their own knowledge ... So as much as possible I want to have it centred on the learners.’ (Frank)

During the micro-teaching exercise,

‘..the hope is that they will involve learners ... and then we don’t allow a lot of lecturing’ (Paxima)

but she went on to acknowledge:

‘..they do a lot of that ... Because we normally tell them to use other methods, but use lecturing. So they copy what we do.’ (Paxima)

However, she recognises that there is no choice but to embrace active methods, as this is Government policy, and that changes are required:

‘...the Commission for University Education is insisting that we should now move out to, from this, er learn, er, teacher centred methods ... Active learning. In fact we are talking about going to active learning ... It is the one that is insisting now we should now go to active learning. So it could be a challenge, but we have no choice. We have to move ...’ (Paxima)

In their own research, my participants have focused on active methods and on whether these impact on student achievement (Paxima, Frank, Henry, Stephen interviews). In my observation of micro-teaching, there was very little attempt by student teachers to involve other learners, despite the aspirations expressed by Paxima (field notes).

Creating a structure for learners is also considered to be very important. Stephen appreciated this aspect of his own experience of school:

‘But there they taught us using the stages. So that you know how you get to ... And I really liked that approach.’ (Stephen)

David commented on the importance of a three-part lesson:

‘The first thing you do is tell them what you’re going to tell them ... Secondly tell them and finally tell them what you told them ... So, I found that to be very important ... I use that a lot with my learners.’ (David)

In the micro-teaching, David commented on the fact that this aspect of their work had improved; more students were able to give a meaningful conclusion than in previous sessions (interview after micro-teaching).

All of my participants talked about the importance of the relationship between the teacher and the learners. They were able to describe good experiences of being taught by kind, responsible teachers. The evidence from all the sessions I observed is that there is a healthy, respectful and friendly relationship between students and lecturers (field notes). As we walked towards the

lecture theatre, Henry was continually greeted by students, some of whom held his hand and walked with us for a few steps (field notes).

Being professional is a characteristic of an effective teacher which cannot be assumed. This is probably a reflection of the fact that entry into teaching depends on reaching certain grades and does not involve an interview.

‘Now when they are students at the university they dress carelessly. So you look at them, the way they are dressing, how they are projecting their voices. Some of them are so shy, they don’t want to look up. But after some training, they are able to now face their students. The eye contact that has been an issue with some. Some of them, I have two now. Last week we, I had to train them on how to maintain the eye contact.’ (Paxima)

I got a sense that effective teaching is also about following a set of rules. Stephen has written a book about teaching chemistry which is on the reading list. It is A5, about 109 pages long and is published and sold internally. The tone of the book is instructional – a set of dos and don’ts of teaching. 40 out of 109 pages are about how to handle chemicals and organise a laboratory (which is considered to be an important part of teaching chemistry) but does not acknowledge that many schools in Kenya will not have the equipment described. The section on chemistry teaching methods is 17 pages, and it describes six prescribed methods (e.g. the lecture method, the project method). There is nothing in the book about how to teach particular topics in Chemistry (PCK).

PCK is central to the TESSA OERs; and, before embarking on this study, I was aware that this aspect of learning to teach is largely absent from courses in Africa, and I was interested to know why. The evidence from my data is that it is not considered to be important. I specifically asked about PCK, and the response was: ‘That won’t come in’ (Henry). I asked where student teachers learn how to teach forces in physics: ‘They learn within the, the subject method’ (Paxima). David went even further:

‘Subject methods are actually special methods, because you do, as an education student, you do general methods of teaching which was the most interesting for me. Because I ... They were saying: Oh a good teacher must support a smile. A good teacher must do this, a good teacher must do this. But then now when it comes to special methods, it becomes a little boring. It was boring to me.’ (David)

One reason for this could be that he has very little PCK himself (not having taught in a secondary school), and he has never been exposed to it. Another reason could be is that it is not specified by the Teaching Service Commission.

‘The Teacher Service Commission, which will not employ you if you have not done sufficient pedagogical courses ... They are very strict. That if you’ve not done philosophy of education, psychology, sociology, curriculum development, then they cannot register you as a teacher.’ (David)

I also asked how student teachers learn to teach questioning and practical work.

‘Erm, we, we, er, we, we, we do it, but I don’t think we have enough time to really teach this issue of questioning here.’ (Stephen)

‘It is instruction. Us, we teach instruction and curriculum. Those are the things we teach. But we have what we call servicing departments ... The servicing departments are the ones that teach the subject matter. But this is problematic ... The way they have been presenting the practicals has not been acceptable, they want to change the format. So they are going for briefing, to be told how now to change the format for the practicals.’ (Paxima)

I asked how else this issue could be tackled, and she started making notes:

‘That’s, that’s, I’m just now starting making this note, that one down. [Laughs] I need to write it down, because I think somebody needs to do some, some, some kind of er, research and find out, because this is er, physics practicals and er, physics practicals and the teaching of, teaching of physics.’ (Paxima)

I felt the fact that she suggested research is needed to find out how to teach practical work, rather than relying on her own professional expertise, was significant, suggesting that knowledge from research is valued more than knowledge gained through practical experience.

Despite this lack of engagement with PCK, there was pride in the fact that they all carry the school syllabus and they all identify strongly as subject specialists, even though they don’t teach their subject.

‘But you see we are training them to go and teach in secondary school ... So they learn the actual higher content in chemistry department. But with us, we, we also are chemists but now we relate it to what happens in secondary schools. That is the kind of chemistry that they know. How they do it with the secondary school teachers, that is what we are, our focus is in the, in the department.’ (Henry)

This was evident to some extent in the session I observed, but when chemical errors relevant to the school curriculum were made by the student teachers, he did not address these, but rather carried on dictating notes on ‘communicating chemistry’ in order to ensure he reached the point he wanted to (field notes).

One participant told me that one of the ways in which the department has changed during the 20 years he has worked here is that there is more emphasis on pedagogy. I asked him how this manifests itself and he responded:

‘We are now focusing a lot more on actually what goes on in the classroom ... for example, the kind of [masters] studies that are being carried out in the department and what they’re focusing on ... There is evidence, you know, evidence to support practice, yeah. That is I think the main.’ (Frank)

However, the course outline has no reference to the teaching methods that formed the basis of their own research studies.

A comment from Paxima suggests that learning to teach is conceptualised as acquiring a set of skills, one by one:

‘Micro-teaching aims at ensuring that competence is acquired in one skill before proceeding to the next.’ (Paxima)

This perhaps explains why there was considerable faith in the course outline. When I asked Henry how he thinks people learn to teach, his response (after much hesitation) was:

‘We have a course outline that we follow. And we hope that if we do this then they learn to know what they’re expected to do. Like preparing the scheme of work, preparing the lesson plan. If you do that in good time and well, then you may deliver. Yeah. So we hope that going through our course outline it is expected that these become teachers.’ (Henry)

I explored whether he felt that there was anything else he could do other than deliver what’s in the course outline to help the students through that process.

‘... one is to involve them actually, give them activities, give them what to do. Either in groups, or you can carry out a demonstration and if they do that, they participate and they share ideas in groups, a kind of interaction. Then they may learn and they can also, you know, be able to know what to do when they go out there.’ (Henry)

He clearly recognises the importance of modelling in teacher education. The evidence from my observation is that he embraces the ‘form’ but not the ‘substance’ (Brodie et al., 2002); he set a short activity during the hour-long lecture, but he did not relate it to what they might do in a classroom.

This department takes TP very seriously. Each lecturer has responsibility for a number of students whom they are expected to visit in school, some travelling considerable distances to do so.

Stephen is particularly interested in mentoring and improving TP supervision, as he does not have a very high opinion of his colleagues:

‘I was going to tell you that one of the things that I found a big weakness among our supervisors is that once they go to their school ... They go to their learning environment. They observe the teaching. They make their comments. After the class the post, the conference between or of the supervisor and the learner teacher. That’s where we have found the biggest weakness. Even, we did a paper on, er, some years ago with my colleagues on TP and we found that that is what and where our supervisors have a challenge.’ (Stephen)

Interestingly, as we talked about TP supervision, he realised that this was where students have the chance to construct knowledge about teaching.

‘Er, they would learn because this is where, you are now reflecting on their performance, in er, ... in a classroom. This is where ... the learner teacher has a chance to ask or to interrogate something together with the supervisor. Or to, where they are unsure. Er, where they’re having difficulties or challenges within their school. Even things outside that observation. There could be something this person is experiencing and he’ll bring it out. ... You see if you, if you are going to make the teacher reconstruct as you are saying, they might say it about that experience. This is where you can bring it out and help them to reconstruct this. Yeah. So that when they go next time, they make, they make use of, of this.’ (Stephen)

Earlier in the interview, I had asked how they teach students to teach children to construct knowledge. He was unable to answer then; but, as I noted in my field notes, this lengthy response reflected something of a revelation for him – an indication of one of the positive consequences of conducting research in this way.

Ideas about schools and teachers

There is a perception that schools are badly organised, badly run and lacking in facilities, and that when their students become teachers, they will develop bad habits (field notes). The departmental instructions on micro-teaching suggest: 'Performance is poor and lack-lustre as most Heads are incompetent' (departmental guidelines for organising micro-teaching, p4). The list of reasons for this blames heads and admin staff, teachers, governors, parents, Ministry of Education supervisors, badly behaved students, organisational structures and lack of accountability. Stephen talked about the need to change the mind-set of lecturers and teachers to encourage them to take a more holistic view and not just focus on examination skills.

Whereas none of my participants condones corporal punishment, there is a perception that 'children we have now are so delicate' (Paxima) that teachers are not supported in disciplining children by parents.

The school syllabus is considered to be out of date. There should be

'more on transistors and topics relevant for children leaving in Form 4 to go to technical colleges' and 'the restoration of project work in Form 4'. (Paxima)

Several participants wanted to see more in the syllabus about *how* to teach alongside *what* to teach.

'...the current version says very little about methodology ... it's very pitiful that nobody's addressing method and yet er, for me ... if I went to a typical school, what I would like to see is a, is, is, is specific methodology being used to teach various subjects, as opposed to leaving this to the, to the teacher to decide ... which is pathetic.' (David)

This is consistent with the deficit view of teachers that I encountered and displays a lack of trust in teachers to be able to exercise agency and decide how to teach. This view was probably reinforced by the absence of teachers when they visit students on TP:

'We do, but I think the biggest idea you have in Kenya is this idea of when you bring the student for TP the others step off. Instead of seeing these ones as people who need help, they are, it is like they now have free time.' (Paxima)

This perception was confirmed by the fact that on three school visits with colleagues in 2015, I did not meet any of the teachers whose classes the student was teaching (field notes).

6.2.1.3 Institutional structures

Institutional structures impact on the relationships between participants and on their ability to take action in the setting. From the data, I identified the approach to research, the expectations of staff, the opportunities for staff, the way teaching is organised and the distribution of resources as being likely to impact on the prospects for change.

Approach to research

Research is highly valued in this institution, and a journal is published regularly which provides lecturers with the opportunity to publish their work (name of journal not given to preserve anonymity). All of the research that I have encountered is quantitative, set in a positivist paradigm. The general approach is to train some teachers to try a particular method, to support them in using the new method to teach their class over a period of time, and to test the class and a control group (who had been taught by normal methods). Through this process, my colleagues have developed a number of teaching methods which could promote change, but interestingly these don't seem to feature in the course outlines. However, in the lecture that I observed, Henry drew on the results of research about the impact of using technical words:

You must use them, but you need to be aware that students will struggle. Research shows it is important to use technical words.

Example 1: Which of the following is not a pungent gas? SO₂, Cl₂, HCl, O₂ – 80% got it right. When it was re-phrased with 'choking/irritating' – achievement went to 90%.

You need to use some technical terminology, but not if it is not necessary.

Example 2: Which gas is a diatomic molecule? CO₂, NO, HCl, O₂ – 42% got it correct, but when question was 'two atoms of the same type' 62% got it right (field notes).

Publishing research is important in order to gain promotion.

'To move now you must show that you can be a potential PhD student. So ... you become a [probationer] lecturer. And to be a lecturer, the safest way of being a lecturer is you come in and you have a PhD ... that is enough. But if you have been here, then you have to show publication, two publications minimum, and then also evidence of registration for PhD. Then you become a lecturer. Now from here things start becoming tight. To move from lecturer position to senior lecturer position you must publish, you must have supervised students.' (Frank)

Despite this pressure, however, there is little support within the university for developing expertise in qualitative methods, or bidding for grants. Stephen told me that his biggest regret in his 30-year career is not securing a significant research grant.

Expectations of staff and by staff

Staff are expected to teach between six and nine hours every week to very large groups.

'So when I mark like now ... I will give them the feedback. There are 134. So between now and Tuesday, Monday, I mark all of them individually and then I look at the weak areas.' (Paxima)

‘B.Ed. Arts, that is Science, there are about three hundred and something. B.Ed. Arts, they, I taught them, there were 586.’ (Paxima)

Teaching is also evaluated by students on a detailed form, with 25 skills to be graded and space for open comments on what lecturers do well, what they don’t do well and what needs to improve. Yet despite this emphasis on improving the quality of teaching, promotion depends on research outputs.

‘So of course research is a requirement. And er, one of the funny things in most universities is that even if you taught badly and you ... if you did research ... You, you, you are kind of regarded better. Even if your teaching is not very good and you don’t even understand the principles of teaching ... Which is a paradox. Nobody gets awards for teaching ... at university. People get awards for research ... So in a way I find that very, very not, not very okay.’ (David)

There are also many other admin duties (often as a result of the lack of IT systems) and pastoral work. Not surprisingly perhaps, people feel under pressure and resent being asked to do more. If staff are asked to access materials online, for example, then the cost of data bundles becomes an issue.

‘They want to be paid, because it’s not part of their old job description.’ (David)

Opportunities for staff

Despite high teaching loads, a lot of marking and pressure to do research, David feels that they have autonomy and freedom to pursue interesting opportunities.

‘Well ... you know here, is very autonomous, first of all. It’s the concept I had of a university. Well I think the, the tendencies for control are there in many other institutions. Controlling how people do things, controlling what they should do, what they should not do. In [this university] I think there’s what I would call academic freedom [sic].’ (David)

This freedom manifests itself in various ways. Frank has worked internationally, which has led to an advisory role at the Ministry of Education; Paxima has built a reputation for herself in the university and been asked to run workshops on active teaching for medical lecturers (Paxima interview); and David has become involved in the work of the e-campus as a result of his expertise in computing (Frank interview and David interview). The cumbersome administration systems have worked to his advantage in this case – the office he was offered in the department was unusable owing to the stacks of paper on all the surfaces, so a colleague offered him a space (unofficially) on the e-campus. In return, he has run some workshops for lecturers on using Excel, without having to account for his time.

Organisation of teaching

Subject teaching is organised and taught in the various science departments, with methodology and education theory taking place in this department. Two participants suggested that this is problematic, because in the science departments they study alongside students whose main interest is science. The education students find it unsatisfactory:

‘... because when they are mixed, they just see physics as physics. They don’t see that they are learning that physics. In fact some of them are asking me: why do we have to do all this physics? And what you are going to teach is below us? You know they can’t really relate. I think that’s a big challenge.’ (Paxima)

She would rather the physics education students were taught physics separately from physics students; but that would have financial implications, as more lecturers would be needed.

Organising teaching for large numbers of students is demanding and has become the main topic for discussion at departmental meetings.

‘Of course like the key thing is division of labour ... Of course there is always a lot of things or communication from the chair. Then another thing that is now coming up is the issues of performance contract ... Like now we have to share, we’re having holiday, school based, yes. Teachers who are coming in service. So we are teaching them. Then we have the marking of exams, they are going to do now and submission of marks. There is also issues of TP. So and, those are the key things. Most of it is the division of labour.’ (Paxima)

Collaboration is important in bringing about change – developing shared understandings and taking ‘collective action’ (May & Finch, 2009). I therefore asked if there were opportunities for collaboration to discuss how they teach students.

‘No ... Because there was an assumption ... that we know, everybody knows how to do this ... No, I’ve not had an opportunity.’ (David)

Resources

The department lacks physical resources:

‘The problem that we experience a lot is support. Support in terms of resources, you know. To be very, very effective we should be able to get resources. Like in places where we teach in fact our own people are now turning towards using ... laptops with ... the slides ... that some of us are still using ... our books.’ (Henry)

Using projectors is also problematic:

‘And even if I, I have my own projector, I can’t project because there’s no socket.’ (Paxima)

‘Last year I was given a room where I could be able to project ... Now this one I was given a room where I cannot be able to project. And there, that, the previous year there were a hundred. This one’s 150.’ (Paxima)

Two people commented on the lack of time to complete the course. If they encounter problems or an aspect of the teaching which people find difficult, there is no time to consolidate. For example, this was one of the reasons given for not developing PCK.

Interviewer: Do you look at different ways of teaching particle theory? During ... my Masters we looked at that, that is the particular nature of matter. But it, but, but here sometimes we simply mention, we only mention, but to get to the nitty gritty ... sometimes it become a problem, because of the time.' (Henry)

'So I wish I had more time, because of these ones have not been able to handle them well.' (Paxima)

The teaching rooms are not very pleasant, often with chairs locked in rows, making group work difficult. In my field notes, I noted that the micro-teaching took place in a basement room. The room smelled of urine, and there was some loud hammering going on nearby (field notes).

Large groups and a significant marking load was also highlighted as a problem:

'...you mark, you set, you do almost everything ... It's a lot ... we even work in the house.' (Henry)

The most frustrating aspect for David is the lack of administrative systems. He uses a laptop and email, but most of his colleagues don't. Making records of assessments is particularly irritating for him, as is having to remember to visit his pigeonhole to collect handwritten memoranda.

'Okay of course we have university systems, but they're not helping reduce lecturer workload, especially in marking and putting on grades ... Because all this is done manually and is prone to error and delays ... I don't find it time well spent. For example after marking ... 350 students' scripts and now I go into another level of entering the marks in a manual system and you know, taking them back to some place ...'

'But I've got to now fill in a form, take it for signing at two places ... from there go to another place ... I find it's really not time well spent.' (David)

The reliance on mobile-phone communication also means that there are constant interruptions to any conversation.

'... interruption with colleagues ... People don't respect say a conversation like say the one we are having ... I don't even know how many of them have such a conversation ... So that is really a problem ... because you want to write an email to someone in the university and then it's a problem.' (David)

Apart from studying for a PhD or a Masters, there is very little opportunity for CPD. There is an expectation that when people join the university, they know what they are doing, with the result that there is no formal induction. I asked the two youngest participants how they were inducted into the role.

'It's just telling you: this is the course outline ... and now, I'll teach up to here. It wasn't mentoring, because ... he didn't allow me to, I didn't even have time to attend his, his classes to see how they do the teaching ... he didn't allow me to.' (Paxima)

‘We’d work, yes, I mean, if you need something, you’d get it from someone who has it. You have a question you can ask ... the planning is not that detailed in my view, because ... I think there’s also an assumption that people know what they are doing.’ (David)

The lack of commitment to training by the department is not limited to induction:

‘It’s becoming very difficult then for them to ... embrace the new technology. We have people who cannot use a computer. There is a time there was an effort to ensure all staff have got a computer to use. But I don’t know what happened. That project didn’t go very far. It started from the senior staff. I think it started and ended there.’ (David)

There was also a sense of a lack of commitment to professional development from some of the lecturers in the department. Stephen was of the view that:

‘... people in this university and elsewhere who are of the traditional mind ... They [students] don’t know ... They’re empty heads. We pour in the knowledge and they note it down, let them give it back to us in an exam. You know, the idea is still there ... They just have the notes, notes, they are become grey notes. But they still want to use those and if you take them they would feel annoyed. They must read those notes in a class and learners must copy page word for word.’ (Stephen)

However, there are occasional workshops on relevant topics, and Paxima negotiated (with my help) some time with the chairman to run a workshop for lecturers on TESSA. The aim was to encourage them to ask their students to use the OERs in the micro-teaching.

There is a commitment to improve the resources; and, after a conversation with two participants in August 2017, I noted the following:

The university is trying to address resource issues – they are gradually giving people computers and have committed to provide projectors, but have not done so yet. The most significant improvement that has happened is that wi-fi has improved. The library has improved considerably, and people now have access off campus. There is a commitment to reduce the issue of class size, but there remains a shortage of lecturers (field notes).

6.2.1.4 Summary: What structures enable and constrain TEs in shaping their agency and developing their pedagogy in line with policy aspirations? (RQ1)

The evidence presented above suggests that TEs are constrained by a curriculum which emphasises knowledge that can be tested by examination rather than focusing on the skills that required by an effective teacher (embodied structures). The resources are limited, resulting in large teaching groups and marking loads. The way in which teaching is organised limits the opportunities to support students in learning how to teach their subject; and the cultural hierarchy (based on age) with associated behaviours, and the importance of being seen to be expert, limits the opportunity for genuine collaboration and the social construction of knowledge about teaching (institutional structures). The assessment regime limits the potential for the discursive structures to develop along the lines of policy aspirations.

However, the level of autonomy has enabled three of my participants to pursue their own agendas (Paxima, Frank and David). Each participant has developed their own conceptualisation of teacher learning and enacts that with their students. Paxima is working within existing structures to challenge her colleagues to examine their own pedagogy. Eventually, this might lead to some modification of the discursive structures.

6.2.2 How do TEs perceive their agency within the structures in which they work?

Chapter 3 argues that professional identity is emergent within the structure–agency framework. Through trying to understand how they see themselves and how they present to the world, I have identified how each of my participants feels empowered or constrained to act within the context of their role, and through this, the prospects for being agents of change. In this section, I present a vignette of each TE, which draws on what I have learned about the social structures in this setting to assess how they perceive their professional identity and how they exercise agency (or not). In CR terms, this is abduction. This will provide the basis for the final section – retroduction – in which I will identify the underlying causal mechanisms relevant to this problem.

6.2.2.1 Paxima

Paxima was one of two lecturers in the department chosen to attend the second TESSA Secondary Science workshop. This experience has empowered her to embrace pedagogic change; and, although she subscribes to the view of student learning and effective teaching described above, her view of teacher learning differs from her colleagues. She models active approaches, using group work and pair work in her own teaching, and is not put off by large classes. She also takes responsibility for students' failures. She and I observed an unimpressive lesson in which a student dictated (too fast) from a textbook. Her reaction was one of dismay – 'we have failed' (field notes) – that he should have completed the methods course at the university and teach such a poor lesson. My first impression of her was a 'supporter' – using TESSA OERs herself and trying to persuade others to do so as well. I changed this assessment to 'supporter and negotiator' when I realised how she was using institutional structures to promote TESSA OERs. For example, she organised a workshop for colleagues in order to introduce them to TESSA OERs, and presented it to the Chairman as preparation for micro-teaching and TP. She used her position as Deputy Director of Quality Assurance to organise a questionnaire asking her colleagues about the performance of their students on TP. Her aim was to gather formal evidence (which her colleagues would take note of) that students were doing too much lecturing (field notes). This was an indirect way of persuading them to use TESSA materials. While I was talking to her in August 2017, she was explaining her role as Deputy Director of Quality Assurance (QA) and started to make some notes reminding herself to ask the external examiners to comment on the extent to

which the course is learner-centred. She has gained a reputation within the university as a good teacher, and was asked to run a workshop on active teaching for the medical lectures.

Apart from these attempts to influence groups of lecturers, one of her strategies is to identify individuals – students and lecturers – and support them in more active teaching. She is something of a matriarchal figure within this group, but regrets the fact that departmental staff don't meet to talk about approaches to teaching. She is constrained in this endeavour by social norms and the automatic respect commanded by older people; she focuses her efforts on the younger lecturers.

She is empowered by her own recent experience of being a teacher. She worked in the locality of the university and therefore has credibility among teachers in local schools. She feels strongly that students and teachers should be relating science to everyday life and often gives examples of how to do this, drawing on her own subject teaching knowledge. She is also empowered to try new approaches by TESSA, but has found that a constraint in this is a reluctance on the part of learners to do more: 'I told them we have to use the pair-share ... At first it was such a battle'.

But she has persevered, and now:

'But if you're persistent ... they were telling me that that's, that's very good. We need to continue ... And I also realised that takes lesser time and less energy for the lecturer ... And the other thing is that the class becomes very exciting ... Because everybody is participating ...'

Paxima is constrained by the demands of the institution with a heavy workload as a result of having multiple roles (physics lecturer and Deputy Director of Quality Assurance). She has faith in the course outline and examination system to deliver effective teachers. She set a test and explained a question about writing a 'table of specification' to me. My view was that all the question was testing was the ability of the students to divide 40 marks into different categories, without showing any understanding of how the different types of questions apply to the physics content. I also concluded that she does not see teaching as a problem-solving activity. When describing group work, she acknowledged that some of the students find this way of working difficult. Her reaction was to recommend that they get counselling rather than that she might explore different ways of organising group work.

'They don't want to work within a group. So they must be having a problem, which I, I want to, to refer them to the counselling, so that that can be addressed.'

Likewise, the teaching of practical physics by the physics department is not deemed to be satisfactory; she does not see this as a problem that is her responsibility, even though she is the classroom expert, and is expecting them to be briefed on how to do it differently.

She is very proud of her PhD and has great faith in research. She is convinced that her own experience of carrying out research has made her a much better teacher. However, the institutional demands and her own lack of training in qualitative methods are making it difficult for her to write up some of the experiences that she has gathered in recent years.

6.2.2.2 Henry

My first impression of Henry was that he was resistant to change – a ‘blocker’. As the research progressed, I realised that he is someone who conforms, does what is expected of him, but at the same time takes the easiest option – he is a ‘drifter’. His account of his past experiences were dominated by a feeling of being mediocre. He went to a ‘middling’ school, not as well-resourced as the best schools, and drifted into chemistry as the teachers were better, despite having been more interested in mathematics. Having moved away from maths into general science, he wanted to be a vet, but his grades determined that he should become a teacher. He studied a Masters at the University of Leeds and learned about social constructivist approaches to science, and was one of two lecturers invited to take part in the second TESSA Secondary Science workshop, but neither experience seems to have made a significant impression on his practice. His mantra to his students is ‘do what I say, not what I do’.

He is constrained by institutional structures and the lack of resources. The constraints are real: he has a large marking load and extra responsibilities advising students; he does not have a computer provided by the university and, as a lecturer, is fairly low in the hierarchy despite his experience. His friends – many of whom dropped into his office while we were talking – are other lecturers who share his mantra. The pressures, however, provide him with what he feels to be legitimate excuses for why he can’t adopt the sort of approaches described in the TESSA OERs; he is thus empowered in his desire to carry on as normal until he retires in a few years’ time.

He identifies strongly as a chemist, and his lecture on ‘communication in chemistry’ included a short interactive exercise (writing a chemical equation). The evidence suggests that this was for my benefit (‘I don’t know what will happen’). Potentially it was a powerful way to engage 200 students in a real chemical problem, but misconceptions were not followed up, and there was no reflective discussion about how they could use such an exercise in their own teaching.

He subscribes to the view of student learning and effective teaching described above. His view of what was involved in learning to teach was limited to following the course outline. The implication is that learning to teach requires mastering a set of rules which if followed will produce effective teachers. Again, the embodied structure empowers him to carry on as he is, and at the same time constrains him in terms of pedagogic change.

6.2.2.3 David

David sees himself as different from other lecturers in the department. He had been at the university for three years when I met him, but gave the impression that he had arrived yesterday, as he did not feel accepted. A year later, I asked him if he felt accepted yet, and the answer was 'no'. He is constrained by what he refers to as a 'condescending society' in which older people demand respect simply for having been in post for a long time. He is frustrated by the ways of working (relying on written memos delivered in pigeonholes for communication) and by attitudes to students and younger lecturers. He was offered an office when he first joined, but it was shared with someone who had been there for many years, and every surface, including his chair, was covered in piles of paper. Rather than tackle the issue, he managed without an office until, as a result of various lucky breaks, he was offered one in a separate building.

He is empowered by the level of autonomy afforded to academics and the freedom to pursue his interest in using IT in education. He is also empowered by his IT skills, which have brought him many opportunities. For this reason, I see him as an 'operator' – someone successfully negotiating structures to meet his agenda.

He worked with a group of three others to design a learning platform for the e-campus, appreciating the opportunity to work as part of a team.

'It was really involving, because I remember the day we did the, we finalised the design of the actions ... and finish the work at 1am. Yeah, we were four of us. So it, er, it is something that deeply makes me feel like I made a...big contribution. Yes. Not really IT. This is learning design work. You know I may not be, sometimes the IT stuff I forget it sometimes ... how to do certain things, the steps. But I don't really mind, but I know I need to work with other people in a team and I know how good a good learning module looks like.'

His knowledge of IT has enabled him to build a relationship with Frank, who now has responsibilities in the field of e-learning on top of his teaching role. This has brought the opportunity to move away from physics teaching to teaching students about how to use IT. In this work, he is more progressive than he was in his physics teaching – setting open-ended projects for students to work on in groups.

As a physics TE, David was constrained by his own lack of knowledge and experience of secondary school teaching. The teachers that he remembers were well organised, systematic and logical in the way they presented material, and this is what he tries to promote. His view of learning to teach was about learning the rules and sticking to them. His lack of interest in PCK (or, as he called it, 'special subject knowledge') reflected his lack of practical experience.

6.2.2.4 Stephen

As a young man, Stephen was involved in innovation; at school he was taught science based on new practical-based courses. These were never rolled out on a national scale because Government schools did not have enough science equipment. He joined the university in order to establish the teacher training course and spoke nostalgically of being part of a team of young professionals working long hours, going round to schools in university vehicles to visit students on TP. He has written a book on teaching chemistry which is on the reading list for the physics and chemistry courses. Over the years, he has supervised many of his colleagues as they worked towards masters and PhD courses, with the result that he is held in great esteem. My initial assessment was that he was a 'blocker' in the face of pedagogic change. However, I revised this view and concluded that he is a 'follower' – someone who is reluctant to take the lead. Over the years, he has served as Dean, as Chairman and as acting Pro-Vice Chancellor, but has not been promoted on a permanent basis.

He is constrained by the view that others have of him. He realises that his own ideas are out of date and regrets the fact that people don't challenge him because of his age and experience.

His book on teaching chemistry is essentially a set of rules of teaching, rather than a toolkit to support practice. However, buried among these rules are some significant insights, which, if they were presented differently, could make a significant difference to the quality of the methods course. Likewise, his views of the supervision of TP are up-to-date and relevant but out of line with established practice, which he has not been able to influence. In his PhD, he developed what he calls the 'Co-operative Class Experiment Teaching Method' (CCETM), which involves students working in mixed-ability groups on class experiments. At the time when the work was done, this was highly innovative, as most teaching was through demonstrations; and today, his ideas about using group work for peer support are highly relevant in large classes. Yet how to teach large classes is not part of the course outline. He is constrained by the lack of engagement of others with his ideas and the lack of collaborative mechanisms.

He rarely uses a computer, but he completed the TESSA Massive Open Online Course (MOOC) (November 2017). He wrote in the course comments that 'he hopes to be a better role model for his students'. I felt that this was a profound comment from someone of his experience and reputation.

6.2.2.5 Frank

Frank's professional identity has been significantly influenced by a long history of feeling different from his colleagues. My initial view of Frank was as an 'enabler': he represented the institution in the TESSA consortium, and drew others in. However, I came to see him as a 'networker' focusing

on his research and external profile; he found more interest in his ideas outside the university than amongst his colleagues.

He studied for a Master's degree in Leeds, where he learned about social constructivist approaches to teaching science, and was involved in TESSA from the outset. Both experiences made a significant impact on him, but he has been constrained by the lack of collaborative mechanisms through which to influence his colleagues. When he first returned from Leeds to teach in a Diploma Teacher Training College, he encountered opposition to his ideas, which frustrated him.

'You know even if I had those [ideas], you know, in my own discipline I don't think I really, er, not many people were supporting me.'

At the university, he promoted TESSA, but found there was more interest from outside the university than from his colleagues; he was invited to work as a Government advisor on the curriculum. His international work has resulted in joint publications. Of all my participants, he has the most impressive public profile; he has played the 'academic game' very effectively.

He has been empowered by TESSA: it has raised his profile both in the university and nationally, resulting in promotion to professor in 2010. He is now involved in e-learning. He is constrained in his work as a TE, however, by the curriculum. On a visit with him to observe a student on TP, he was focused on marking the student's file rather than on teaching and learning. The student organised some group work. Frank commented to me that although they were sitting in groups, they were working on their own, but did not comment on this to the student.

6.2.2.6 Summary: What are the TEs' perceptions of their agency in relation to their role as a TE in this institution? (RQ2)

Each participant interacts differently with the social structures. Of the five, Paxima is the most motivated to achieve pedagogic change and is working within the structures to achieve this. Frank was so constrained by the embodied structures that he has looked outwards from the institution in order to gain acceptance of ideas that he cares deeply about (social constructivism and TESSA). He is enabled by the high level of autonomy afforded to lecturers. David was also constrained by the institutional structures (lack of IT infrastructure and opportunities for genuine collaboration), and he has used this high level of autonomy to gradually move himself into a different role, more focused on ICT teaching. Stephen is constrained by the cultural hierarchy, and associated behaviours, which afford him more respect than he wants. He has some innovative and radical ideas but has not had the influence that might be expected from his position as a professor. Henry is constrained with respect to pedagogic change by the embodied structures, but the same structures enable him to justify his actions and maintain the status quo.

In order to make sense of the evidence about structure and agency, I went back to the findings in section 6.1.3 (empirical level of reality) and identified four disconnections, which in CR terms are the 'events' which take place in the 'actual' layer of reality (immediately below the surface of the iceberg).

6.3 What are the disconnections that emerge at the 'actual' level of reality?

Looking across the data, I have concluded that the structures interact to create a number of disconnections linked to the empirical-level findings, which impact on the prospects of TEs as agents of change. The findings in section 6.1.3 suggested a policy environment asking for pedagogic change; a course producing well-qualified effective teachers; a research-engaged department; and teaching methodology being taught by a group of people who identify strongly as scientists. In fact, I found very little discussion of pedagogy; an assessment regime which tests a limited range of skills that are not necessarily related to effective teaching; the separation of research and teaching; and a lack of interest in, and knowledge about, how to teach science. In this section, I elaborate on each of these disconnections.

6.3.1 Ideas about teacher learning

Across all five participants, I encountered a consistent view of effective teaching and student learning in science. There is not, however, a shared view of teacher learning, or a focus on the pedagogy of teaching teachers. I originally had this as a potential discursive structure, but the evidence is that there is a disconnection between the embodied structures (curriculum and exams in particular) and the discursive structures (views of effective teaching and learning) which manifests itself in the absence of a strong consensus about what it means to learn to teach, or a vision for teacher learning.

David feels the pressure to teach well ('I agonise how to deliver particular content when I'm a teacher educator' (David interview)), and Paxima works hard at modelling the sort of pedagogy she is trying to promote, despite initial opposition from the students. She is gradually beginning to influence younger members of the department, on a one-by-one basis, and is using her role in the QA department to gather formal evidence that things need to change. Henry and Stephen have faith in the course outline, and the pedagogy course designed by Stephen for lecturers elsewhere in the university focuses on things like how to design a scheme of work, how to write different sorts of assessment items and how to keep records, rather than on interacting with students.

Stephen understands the significance and importance of TP supervision and the opportunity for students to reflect on their own teaching but has not been able to significantly influence his colleagues in this respect. In both of the micro-teaching sessions that I observed, there was an attempt to encourage students to reflect on their own contribution and to evaluate each other's.

They were very reluctant to comment (field notes), and my impression is that this is not a well-developed aspect of the programme. The students I met on TP expected to be told how they had done (field notes), and were not given the chance to reflect on their own teaching.

The disconnection is that information about teaching is passed on with little regard for the underlying messages that the mode of delivery creates. Theory and practice are treated separately. This discursive structure (ideas about teacher learning) is perhaps not fully developed in this institution, which limits the prospect of systematic pedagogic change.

6.3.2 Teaching vs research

Research has a high profile in this institution, with their own journal and promotion criteria linked explicitly to the number of publications achieved. Frank has used this to establish a profile for himself. David is frustrated by what he sees as a contradiction – academics don't get credit for being good teachers – and Paxima demonstrated faith in knowledge from research, over her own professional knowledge based on 20 years of teaching experience. Henry's proudest achievement is his PhD (achieved in 2004, 15 years after starting in the department), and for many years his greatest frustration – adding to his feeling of mediocrity – was that there was no-one available to supervise him. Stephen has supervised many masters and PhD projects and therefore has his name on many publications, although he regrets not being involved in a significant national or international research project. Thus, the value of research is an important part of the discursive structures.

As Frank suggested, and the journal (2015) shows, there is an emphasis in Masters and PhD projects on pedagogy. This manifests itself in a set of teaching approaches (each with an acronym), tested in quasi-experimental studies. However, these don't feature in the course outline, and my participants did not talk about these methods in relation to their own teaching. This is possibly because the methods tend to be presented as a set of prescriptive behaviours rather than as general principles to be interpreted for a context. They have not made much impact therefore beyond the people who devised the method, amongst people with little classroom experience.

Thus, research is taken seriously as an activity, with research knowledge being highly valued. However, the knowledge gained from research is not integrated systematically into courses, except through individuals providing examples in their teaching. There is a disconnection between the discursive structure and the embodied structure (the curriculum).

6.3.3 The assessment of teaching

This course is assessed mainly through examinations, which test the recall of knowledge (Appendix 8). I have seen four checklists or questionnaires which assess classroom teaching, and

the focus in all of them is on what the teacher does, rather than on the learning which is taking place. The notion of 'formative assessment' does not feature, suggesting an assumption that if something has been taught, then it has been learned. On TP, the emphasis (28/32 of the criteria) is on what the teacher is doing rather than on the impact of the teacher's actions on the learners.

The feedback during micro-teaching focused on a number of useful details such as how the chalkboard was set out, any resources that were used and the structure of the 'lesson'. But much was missed in terms of subject knowledge, conceptual demand and alternative ways to teach key concepts.

The disconnection is that much of the assessment (an embodied structure) on this course does not focus on the things set out in the literature (Cochran-Smith & Lytle, 1999; Shulman & Shulman, 2007) that students need to know, to understand and to be able to do to become effective teachers.

6.3.4 Subject identity and pedagogical content knowledge

All my participants identify strongly as scientists. However, there is a lack of interest in, and emphasis on, the details about how to teach their subject. They draw on examples from science to illustrate their ideas, and when talking to any of them you soon learn that they are a physicist, chemist or biologist; but questions that I asked such as 'where do students learn how to teach forces?' or 'where do students learn how to teach particles?' were greeted by hesitation or with 'that won't come in' (Henry).

The disconnection is that subject identity is important and that teaching chemistry is seen as different from teaching biology and physics, yet students don't get to learn about, or to discuss, different ways of teaching specific concepts. The course is organised into separate disciplines, and the lecturers see themselves as subject specialists. However, in the micro-teaching, none of the feedback or discussion focused on the science concepts, or how they had been presented, or how they could have been presented. A consistent feature of the micro-teaching and of the TP lessons that I observed was a lack of cognitive demand, yet this was not commented on.

6.3.5 Summary

These 'events' (in the actual level of reality) relate to the empirical-level findings and are set out in Table 6.3.

Table 6.3: The link between the findings at the empirical and actual levels of reality

Empirical-level finding	'Events': actual level of reality	Disconnection that needs to be explained
Pedagogic change (in particular the ideas associated with LCE) is part of the policy context.	There is no shared understanding of teacher-education pedagogy.	TEs teach about teaching but do not habitually examine their own pedagogy. Some model active approaches, but this is not embedded in the practice that I saw.
This department has a good reputation in the local area. Their student teachers easily find employment and are considered to be well-qualified, effective teachers.	Credit is given for the recall of theoretical knowledge. On TP, the focus is on what the teacher does.	Much of the assessment does not focus on the things that students need to know, to understand and to do to become effective teachers. On TP, very little attention is paid to the impact of the teaching on the learners.
Research is taken very seriously in this institution, with promotion depending mainly on publications rather than teaching performance.	Research is positivistic in nature and generally consists of quasi-experiments designed to test particular teaching approaches.	Research and teaching are completely separate. The findings from the research are not integrated into teaching. Knowledge from research is valued much more highly than professional knowledge gained through experience.
All the participants identify strongly with a science discipline.	Students have no formal teaching on how to teach different science topics.	Despite the strong identity of participants as scientists, PCK of science is absent from this course.

In the next section, I present three underlying causal mechanisms, which the evidence suggests could be giving rise to these disconnections. This is important because understanding the reasons underlying these disconnections ('events') will inform my professional practice.

6.4 The real level of reality: underlying causal mechanisms

This is the point in the analysis process referred to as 'retroduction'. The aim is to identify underlying causal mechanisms which could have given rise to the disconnections ('events') that have emerged. I have identified two causal mechanisms which are relevant to my problem:

- the view of the nature of knowledge about teaching, and
- the absence of collaborative 'spaces' – both intellectual and physical.

I will also argue that the TESSA OERs have the potential to be a causal mechanism, but in CR terms this mechanism is not activated, owing to the nature of the embodied structures.

6.4.1 The nature of knowledge about teaching

Throughout the data, I have come across evidence that my participants see knowledge about teaching in rationalistic terms. They see it as objective, fixed, external to the knower, like

knowledge about physics, or knowledge about chemistry. Here I highlight the parts of the evidence above that are relevant to this claim, and explain how I think this mechanism gives rise to the ‘events’.

Frank explained that interest in pedagogy has grown, as demonstrated in the nature of Masters and PhD studies in the department. This manifests itself in a series of quasi-experimental masters and doctoral level studies, in which a large number of teachers (so that it is statistically significant) are taught to apply a particular method (for example, CCM, or the CCETM), and are then asked to teach using that method. Pre- and post-tests are carried out with their classes and a control group (who have been taught using ‘normal methods’), usually demonstrating, using statistical methods, that the chosen method has had a positive impact. Interestingly, however, none of the approaches described to me by my participants is mentioned in the course outline – yet the extract given here (Table 6.4) suggests an accumulating body of knowledge. (NB The full reference is not included to preserve anonymity).

Table 6.4: Evidence demonstrating the nature of the research carried out in this department

Extract from a paper published in the departmental journal, 2015
<p>Pages 64–65 (names have been left out, as a number of them were my participants)</p> <p>In an attempt to improve the teaching and learning process in science, research on teaching methods and approaches have been carried out in Kenya. (Reference 1, 2004) found out that Cooperative Class Experiment (CCE) Teaching Method facilitated students’ chemistry learning. This method also increased students’ motivation to learn. The Cooperative Concept Mapping (CCM) approach teaching method enhanced the teaching of secondary school biology in G district (Reference 2, 2005). A research done in the teaching of physics by (Reference 3, 2006) using Mastery Learning Approach (MLA) revealed that students taught using the approach outshined their counterparts taught using CTM [conventional teaching methods]. This study addressed the effects of CMLA [Cooperative Mastery Learning Approach] on students’ achievement in Chemistry. The CMLA brings together cooperative learning and mastery approaches to teaching. It is therefore a hybrid of the two approaches and therefore motivated the students by not only appealing to their cognitive domain but also their affective domain.</p>

This view of knowledge about teaching means that the methods developed are presented in a confusing and laborious way; my thesis is that this contributes to the disconnection between teaching and research. For example: the CCETM is presented as having seven elements (*Book by Stephen*, p81). The presentation of the idea converts what is actually an innovative, potentially important contribution to LCE, in a context in which classes are often large, into an apparently complex set of behaviours. The simple message (that peer support is helpful in dealing with large groups) is lost in the attempt to spell out to the student teacher every single detail of what they should be doing, as if there is only one way of achieving the desired outcome. The assumption is that the student needs to be told exactly what to do, rather than accepting that, as a young adult,

they could engage with the principle (using groups to set up opportunities for peer support) and work out how to do it for themselves.

In completing studies like this, TEs are behaving as if the results are universal and can be treated as ‘fact’. This cannot be the case, as it is not possible to control all the variables. However, it does not mean that researching different approaches to teaching is not a worthwhile activity, only that more emphasis should perhaps be placed on the process as a means of understanding a particular context, rather than trying to establish objective truths about how to teach.

This theory – that knowledge about teaching is seen as objective and context-free – also explains the disconnection between theory and practice, and the lack of connection between the messages given (learners should be actively involved) and the way in which they are delivered (mostly in a lecture format). In these circumstances, effective teaching becomes about sticking to the rules. Genuinely involving learners cannot be reduced to a set of rules; good teachers are well organised but flexible and learn through analysis of teaching and reflection on practice. When teaching is presented as an unproblematic set of rules, if the rules don’t work, teachers do not have resources to fall back on.

The course outline for this qualification identifies a set of methods for teaching science:

Extract from Physics course outline

Week 3, 3 hours

Teaching strategies applied in physics at secondary schools. Inductive and deductive reasoning, lecture, questioning, demonstration, class experiments, fieldwork and project

A book on the reading list provides more detail on the ‘demonstration’ and ‘questioning’ methods, for example, but without some subject context each method is presented as a set of generic do’s and don’ts, which are learned for recall in the examination.

The feedback to students in the micro-teaching focused on whether the rules had been applied successfully, not on their interpretation of them within the context of science subject matter.

Examples of comments from micro-teaching illustrate this:

‘assignment given according to the lesson plan’

‘partially cleaned the chalkboard’

‘neat drawing but too small’

‘use present continuous tense not past tense on your lesson plan’.

The most frequent aspect of their presentations to be commented on was whether or not they cleaned the chalkboard. Very few comments were made on the fact that the vast majority of the

questions posed were closed questions, or that the scientific content was generally undemanding, or that very little attempt was made to link the science to everyday life.

Micro-teaching is presented as the opportunity to practise discrete skills. 'Micro-teaching aims at ensuring that competence is acquired in one skill before proceeding to the next' (Departmental guidelines on micro-teaching, p1). This reductionist approach is based on the assumption that once each skill is separated out, practised and mastered, the student will have become an effective teacher.

Another piece of evidence that supports this view is the absence from the documentation of specific references to the Kenyan context. Effective teaching is presented as objective, with rules which are independent of context. The text (*course reader written by Stephen*) reads as if every school has a well-equipped chemistry laboratory. There is no section on how to improvise equipment or on ways to teach in low-resource environments. The only concession to context is knowing about the history of teaching of that subject and how the curriculum has changed, with nothing for example on teaching large classes, or on literacy (given that learners will not be learning science in the language they speak at home).

This view of knowledge about teaching explains some of the disconnections around assessment. The fact that this might be a causal mechanism first occurred to me in a discussion about a test some students were doing during my fieldwork. They had to draw up a 'table of specification' as part of a question testing whether they knew how to write a 'good' test (one which tests all the content and produces a good spread of marks).

A 'table of specification' had rows labelled with science content and columns labelled with types of question (knowledge, comprehension, application, analysis, synthesis, evaluation). The total marks for the test needed to be distributed between the cells in the table so that the sum of the rows and columns each added up to the total, showing that a well-written test would cover all the content and include a range of different types of questions.

The question was to draw up a table of specification for a 40-mark test on magnetism. It actually tested whether students could distribute 40 marks among the various boxes; they were not required to demonstrate that they knew what the different question types might look like in the context of magnetism by providing examples. Being able to answer the question that was set did not indicate that they could write a meaningful test on the scientific content; rather it indicated that they knew the rules behind test-writing. Things which are subjective are not examined (e.g. writing different types of questions), with the result that many important aspects of effective teaching are not assessed.

Evidence that knowledge about teaching is viewed as objective and fixed also came from my analysis of the way in which teaching is assessed. On the lesson-observation form used on TP, there are 32 separate statements to be scored. Only four of them require the observer to make judgements about the learners. If the plan is written in the correct format and the student sticks to the plan, they will score highly.

Finally, this view of knowledge about teaching perhaps helps to explain the lack of engagement with PCK. By its nature, PCK is subjective (Cochran-Smith & Lytle, 1999). This course is dominated by ‘knowledge *for* practice’ (Table 4.1, Chapter 4). PCK combines ‘knowledge *in* practice’ and ‘knowledge *of* practice’ but is ignored; it is the sort of practical knowledge that teachers have and is perhaps, therefore, considered to be of less value than the knowledge held by university lecturers.

6.4.2 Collaborative working

The second explanation (causal mechanism) that I propose for the disconnections and behaviours that I saw is the lack of opportunity for collaborative working. This causal mechanism prevents patterns of individual behaviour which could be helpful with respect to pedagogic change, such as sharing of resources, asking for help and critical reflection on practice. Two participants (David and Stephen) talked wistfully about times when they had been part of a team working towards a shared goal, with each member of the team contributing different skills and ideas. But it is not something that any of my participants have experienced recently in the context of their role as a TE on the degree course.

They meet to discuss the distribution of teaching, but not how to teach. There is no induction programme or systematic CPD, although there is an expectation that new lecturers will study for a Masters degree (if they don’t have one) or a PhD. Various attempts have been made to induct lecturers into TESSA, but, as the chairman put it ‘TESSA is not yet strong’. Meetings are very formal (see agenda in Table 6.5). Paxima confirmed that this meeting was typical (field notes); the items are procedural, with no opportunity to share practice.

Table 6.5: Agenda for departmental staff meeting

Departmental Staff Meeting agenda (29th March 2016)	
1.	Apologies
2.	Conflict of interest
3.	Communication from the Chair
4.	April SSP/SB Teaching Allocation
5.	Nomination of External Examiner for EAPE units in the Department
6.	Any Other Business

Learning to teach is a complex activity; the evidence from Frank and Paxima is that it is difficult to initiate discussions about the teaching in the department, and from David that this complexity is ignored because there is an assumption that lecturers are already experts in teaching methodologies. I asked him if he ever collaborated with his colleagues to talk about *how* to teach rather than *what* to teach.

‘No ... Because there was an assumption ... that we know, everybody knows how to do this ... No, I’ve not had an opportunity.’ (David)

I asked Paxima if there is opportunity to discuss issues such as how to support lecturers in becoming more learner-centred.

‘No, no, not that, no, no, I don’t think I’ve seen such. We have not, that is one thing we have not done. You see at times when you want to come up, you know and make that, it’s a struggle at the times. Even when we bring them together. We want to tell them, I mean really, how they should employ their classes. Er well, they come, some take it very well, others it is just a pastime. So, er, because I’ve not seen any discussions in the, in the department along that line.’ (Paxima)

My evidence suggests that the social norms make it difficult for lecturers to admit that they don’t know something. During micro-teaching (which was done in mixed-subject groups), hardly any of the feedback addressed PCK, and errors in subject knowledge were not picked up. This could have been because they were missed. There are no ‘safe’ spaces in which to ask for help with alternative ways to teach concepts that are outside their subject area.

6.4.3 TESSA materials

Given these two causal mechanisms, I suggest that the TESSA OERs (not the focus of the study, but nevertheless part of the context) could be conceptualised in terms of a causal mechanism that has not been activated. My initial study involved a detailed analysis of TESSA SS based on a framework synthesised from the literature on effective student learning and effective teacher learning (Stutchbury, 2015). I concluded that TESSA SS OERs have the potential to support student and teacher learning in science. In terms of teacher learning, more emphasis could be placed on collaboration but this could be addressed through mediation of the OERs. The analysis showed that TESSA OERs challenge the prevailing view of knowledge about teaching and could provide a reason for more collaboration to take place, as teacher educators consider how to introduce them to students and how they could support their own teaching. They present a view of knowledge about teaching as being socially constructed through practice in a particular cultural setting. Teaching is conceptualised as a problem-solving activity, with the emphasis on teachers trying things out and reflecting on what happens in order to develop skills appropriate for the context in which they work. In workshops, we encourage TEs to work together to analyse specific case studies and activities in terms of potential teacher learning and to work out ways to use the examples with their students.

Through practical examples of classroom activities, TESSA OERs provide PCK for people who might not have taught for a long time; they could help tackle the disconnection between the theory and practice of teaching. They explicitly draw on research, showing how the findings from research can be applied in real classrooms. We also know that repeated use of the OERs over time leads to a greater awareness of learners and learning (Stutchbury et al., 2018), which could eventually lead to a different view on how STs could be assessed.

The results of this analysis are important in the context of the policy environment: the TESSA OER support the aspirations set out in Chapter 2, and if adopted by teachers and teacher educators could support the sort of changes that are being asked for. The evidence that this causal mechanism is not activated comes from the lack of engagement with the materials, despite knowing about them (particularly from David, Stephen and Henry), and from the professional narratives. These reveal my participants intentionality, and only Paxima is currently focused on improving her own pedagogy. David admitted to feeling pressure as a result of the fact that he is doing the activity that he is teaching about. His reaction was not to examine his own pedagogy, but rather to exercise his agency in order to change his role from teaching physics to teaching ICT. Frank used TESSA OER to develop his own pedagogy, but the lack of interest and support from colleagues drove him to seek new opportunities outside the university.

This finding – that TESSA could be a causal mechanism but is not activated - provides empirical justification for the work that we are doing in international development and as I will demonstrate in Chapter 7 has influenced the direction of travel of the TESSA programme, as we seek ways of understanding the motivations, and priorities of our teacher educator colleagues, and how these could interact with the prevailing social structures to bring about change. The fact that TESSA resources are ‘open’ makes it difficult to collect evaluation data – we simply don’t know the full range of the TESSA network. But this study will help in the justification of that work.

6.5 Summary

I have analysed my data in terms of ‘structure’ and ‘agency’. This has enabled me to identify four significant disconnections (related to the findings from the empirical level of reality) which impact on the potential for TEs working in this department to act as agents for change. I have argued that these disconnections are related to two causal mechanisms. The TESSA OERs have the potential to be a causal mechanism, but at present are one which has not been fully activated.

There will be other causal mechanisms at work, related to social norms and structures of agency (individual characteristics of the actors involved). However, I am looking at this from the perspective of an outsider involved in educational development work and have concentrated on looking for causal mechanisms that will support my professional role as TESSA AD. In most of the

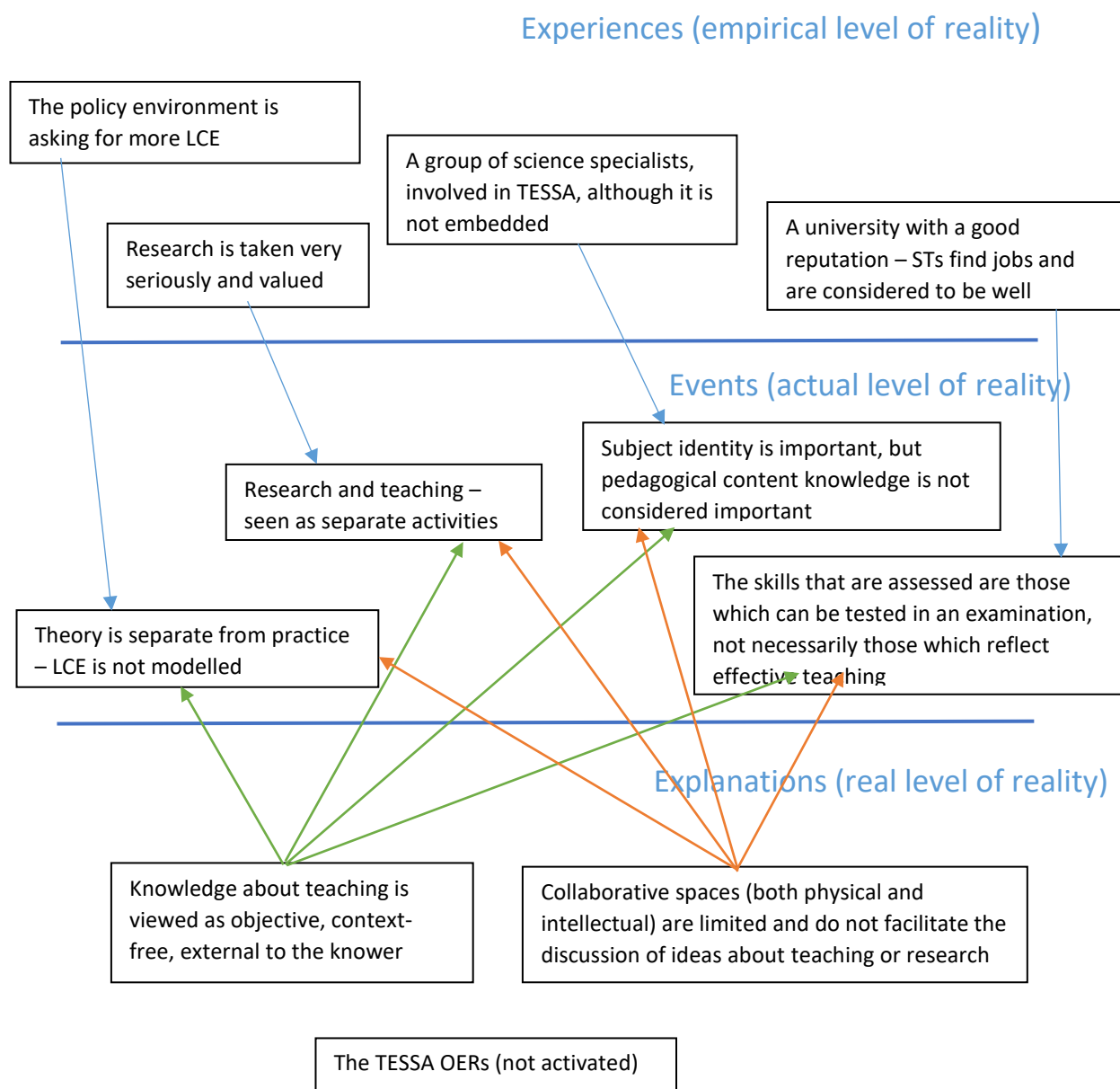
situations in which we work, we do not have the opportunity to get to know the TEs we are working with as well as I have done, or to understand the full extent of the impact of the social norms on the work of TEs. It is possible, however, through our work to engage with the discursive structures – the ideas underpinning the activities of the actors – and to become familiar with the embodied structures. So, understanding the causal mechanisms which could impact on these is highly relevant. My overall findings are summarised in Figure 6.1 (see next page).

Figure 6.1 sets out the four empirical findings and show how they each link to a disconnection. Given a policy environment asking for more LCE, we might expect the institution to be discussing and implementing these ideas. Given that research is highly valued as an activity, we might expect that the knowledge gained through research to be integrated into teaching. Given the strong subject identity of my participants, I expected to find an interest in how to teach their subject (PCK), and given the fact that the university has a good reputation, it could be expected that the students would have been assessed against a framework for effective teaching. As shown, the main assessment is an exam requiring the recall of knowledge about teaching and the lesson observation forms miss many aspects of effective teaching.

The underlying causal mechanisms (real level of reality) explain each of the disconnections. The assertion is that if a socio-cultural view of the nature of knowledge about teaching was enacted by this group (through their teaching and assessment) alongside genuine collaboration and critical reflection on the practice of learning and teaching, then these disconnections would disappear (although this does not necessarily imply that others would not emerge). The third causal mechanism (TESSA OER) is not activated; the TESSA OER are not institutionalised in this university department. This is represented by the fact that there are no arrows linking it to the disconnections.

In the next chapter, I will consider the implications of what I have discovered for teacher education and the prospects for pedagogic change, and for the work we are engaged in at the OU.

Figure 6.1: A summary of my findings at each level of reality and how they link together.



7. Discussion

In this chapter, I start with a summary of the findings. I then link the findings to the literature discussed in Chapters 4 and discuss the implications for pedagogic change.

7.1 Summary of findings

Drawing on Scott's typology (2010), in Chapter 6, I presented the findings in terms of the embodied, discursive and institutional structures. Considering the evidence alongside what I discovered about the perceived agency of my participants, I identified four 'disconnections', two causal mechanisms (views of the nature of knowledge about teaching and the absence of collaborative spaces) and one potential causal mechanism (TESSA OERs).

The 'embodied' structures of the curriculum – ideas about how to assess teaching, the examination system, and certain social norms – serve to constrain teacher educators in adopting learner-centred pedagogies. They provide excuses:

'... the time, you don't have the time and then to cover what you want to do' (Henry explaining why he does not use habitually use group work)

but also justification for current practice

'we have a course outline that we follow. And we hope that if we do this then they learn to know what they're expected to do' (Henry talking about how student teachers learn to teach).

This is consistent with some of the early findings from TESSA (Wolfenden et al., 2010).

I identified four 'discursive' structures – the ideas that underpin the work of the group. There is a consensus around some: ideas about effective teaching and learning for school students (social constructivism), ideas about schools and teachers (a deficit view), but no consensus around teacher learning and a lack of emphasis on PCK. Paxima works within these structures, but her influence is restricted to those who are younger and less experienced than herself, owing to social norms (embodied structure). The institutional structures both constrain and empower. The level of autonomy afforded to TEs enables Paxima, Frank and David to pursue their own agendas, but the lack of institutional 'buy-in' to the national policy framework means that only Paxima's efforts are directed towards implementing LCE.

My participants are agentive in different ways. For Henry ('drifter'), the structures provide justification for how he chooses to carry out his role; Paxima ('negotiator and supporter') works within the structures to promote an LCE agenda; Frank ('networker') has used research to establish a national reputation outside the university; and David ('operator') has manoeuvred himself into a new role. The least agentive is Stephen ('follower'), who finds his status unhelpful ('we look like we are the, the godfathers' – Stephen interview). This is perhaps surprising, as he is

the most senior participant and has, some radical ideas (around the supervision of TP and peer assessment), but these ideas have not spread around the institution.

As a result of this analysis, four disconnections emerged – inconsistencies between empirical findings (experiences) and the ‘actual’ level of reality (events). These are impacting on the capacity of this group to embrace the sort of changes set out in the national policy agenda, and are:

- LCE and pedagogic change is part of the policy discourse for education, but is not high on the agenda in this institution, despite the fact that it is one of the elite in teacher preparation, offering degree-level qualifications.
- This group of science TEs, identify strongly as scientists. However, PCK (how to teach specific topics) is not part of the curriculum or part of the discourse.
- Research is valued highly, with lecturers being judged on their research outputs. Masters and PhD studies are published in a university journal, and the projects from this department have a pedagogical focus. However, the learning from these studies is not systematically linked to teaching.
- This department has a good reputation, and student teachers are sought after in the jobs market. However, the assessments that they undertake focus on the recall of ‘knowledge *for* practice’, and on their actions as a teacher, rather than on their impact on learners, ‘knowledge of practice’ or ‘knowledge in practice’.

I have identified two causal mechanisms that operate to produce these events – the collective view of knowledge about teaching (as objective, unproblematic and external to the knower) and the lack of effective collaborative networks that exist within the department, (linked to social and institutional norms). I have argued that TESSA has the potential to be a causal mechanism that could change these events, but it is not activated.

7.2 Knowledge about teaching is objective

The consequence of treating knowledge about teaching as if it is fixed, objective, external to the knower, and held by a few ‘experts’ (whose job it is to pass it on) pervades the whole experience of learning to teach. In this section, I re-visit some of the literature explored in Chapter 4 through the lens of this causal mechanism.

Drawing on my own experience of teaching and teacher education, I am of the view that knowledge about teaching is best understood as being situated in particular social and cultural contexts (Kelly, 2006; Putnam & Borko, 2000) and that effective teacher education needs to help student teachers make sense of the cultural context in which they are teaching (Taylor, 2008). The focus on ‘knowledge for practice’ (Cochran-Smith & Lytle, 1999) and examinations which require

the recall of this knowledge, limits the opportunities for student teachers to develop a vision for effective teaching that is appropriate for the context, to analyse and discuss teaching and to acquire 'knowledge of practice' (Shulman & Shulman, 2007). The finding that knowledge of teaching is considered to be objective, is therefore consistent with view that teacher preparation courses in SSA are generally considered to be too theoretical and not as effective as they could be (Dembele & Miaro-II, 2013; Moon & Umar, 2013b; Vavrus, 2009; Verspoor, 2008).

In this institution, my data show that learning to teach is presented as a set of rules and is presented as unproblematic; the assumption is that if you follow the rules you will be a good teacher. Teaching is treated as something that is done by teachers and is not linked to learning, and the tests and examinations used to decide if a student qualifies means that many of the skills and attributes of effective teachers are not assessed. However, TP is taken seriously, with many tutors travelling large distances to visit students in their schools; time is devoted to micro-teaching, with every student having at least two opportunities to teach their peers; and one assessment task involves the production of a teaching resource, which is then donated to the partner school. I suggest that this indicates that there is some scope for change. Strengthening these activities through assessment criteria that focus on learning as well as teaching and improving the quality of supervision (as suggested by Stephen) could help students develop their 'knowledge of practice' and 'knowledge in practice'.

PCK combines different forms of knowledge about teaching. It cannot be prescribed, or reduced to a few simple rules, and has to be interpreted for context (Cochran-Smith & Lytle, 1999). The view of knowledge about teaching as being objective and unproblematic perhaps explains the lack of interest in PCK and the fact that there is currently no place in the curriculum at this institution for the discussion of how to teach particular topics.

The reductionist approach – breaking teaching down into parts which can be mastered separately – that was evident in the 'guide to micro-teaching', and in Paxima's interviews, has been noticed elsewhere. In Ghana, Akyeampong (2017) reports that college lecturers took some sound ideas about the use of teaching and learning materials and group discussions and reduced them to a set of procedures which students were expected to learn and reproduce. This approach leads to missed opportunities for developing a holistic understanding. For example, in the course outline in this institution, theories of learning come at the end, after the section on teaching strategies. The latter would make more sense if they are located within ideas about learning. It also means that teaching is not problematised. TEs do not see themselves as problem-solvers and therefore do not train their students to be problem-solvers (Paxima interview).

This view of knowledge impacts on the research carried out in this department, which is carried out in a positivistic paradigm (departmental journal). This series of large-scale studies usually concludes that the 'intervention' has worked, yet the ideas behind the interventions are not incorporated into the course outlines. The way in which information about the teaching approaches that have been tested is presented, suggests a view of learners (student teachers) as 'a blank page'. Rather than being supported in interpreting general principles for their context, student teachers are given detailed lists of behaviours they need to adopt.

Akyeampong (2017) suggests that there needs to be a 'paradigm shift in teacher educators' practices of teaching methods courses and their vision of good teaching' (p201). This study suggests that the paradigm shift required concerns the nature of knowledge about teaching. Once it is acknowledged that there might be more than one way to support learning in a particular context, and that TEs, teachers and student teachers have equally valid contributions to make to the discussion, a more critical approach to practice, including their own, will follow. Without this paradigm shift there is a danger that the 'form' rather than the 'substance' (Brodie, Lelliott, & Davis, 2002) of LCE will be implemented, and that pre-service teacher education will not prepare teachers for the real world.

Schweisfurth identifies a number of 'barriers' to the successful implementation of LCE (Schweisfurth, 2011). In Chapter 4, I suggested that these could be conceptualised in terms of a lack of 'coherence' and the challenge of securing 'cognitive participation' in pedagogic change (May & Finch, 2009). Re-visiting these in the light of the findings, I argue in Table 7.1 that all of them are underpinned by a view of knowledge about teaching which is objective, fixed and unproblematic.

Table 7.1: Schweisfurth's 'barriers' LCE (2011) and the link to the first causal mechanism

Barrier to change	Link to causal mechanism
An over-ambitious and under-resourced reform programme	Cognitive dissonance between the reform (LCE) and current practices make pedagogic change demanding for teachers. LCE is based on a view of knowledge about teaching as socially constructed in a particular cultural context. Teachers need resources and training to understand the implications of this.
Local conditions (large classes and a lack of resources) which make it very demanding for teachers	Initial teacher education focuses on 'knowledge for teaching' with very little discussion of local conditions, or the 'how' of LCE. There are expectations around developing teaching resources, but nothing, for example, on teaching large, multi-lingual classes. When student teachers get jobs the 'rules' they have learnt often don't work in practice and they have not been trained as problem-solvers.
Inadequate teacher education and a lack of motivation from teachers	
Contradictions in the form of attitudes which see teachers as 'experts' and learners as 'empty vessels'	LCE assumes learners bring prior experiences and learning to the classroom and that they have contributions to make. 'Knowledge for practice' is in the hands of experts, to be handed down to STs. Data from David in particular confirmed that these teacher educators see themselves as experts, which discourages challenge, discussion and consideration of alternative approaches.
An inappropriate curriculum and examination system	The focus is on 'knowledge for practice' which can be examined. The result is that the emphasis is on this, at the expense of other forms of knowledge about teaching. The data show that aspects of effective teaching go unexamined. Passing the exam, requires the recall of knowledge for practice.

These 'barriers' mask the underlying social reality (Checkland et al., 2007) that knowledge about teaching cannot be considered to be objective and fixed, and it is this that is preventing progress with respect to LCE. Our work in the TESSA network shows that where teachers engage with TESSA OERs, real progress can be made (Stutchbury et al., 2018). Problems do not disappear, but our evidence suggests that the problems – and potential solutions – are owned by the teachers rather than being presented as excuses.

7.3 A lack of collaborative spaces

The second causal mechanism – the absence of collaborative spaces and collaborative working – contributes to each of the disconnections identified at the ‘actual level’ of reality. This causal mechanism is consistent with an observation from Bob Moon (2010):

Teacher education institutions, whether universities or colleges or other forms of organisation, sometimes find it challenging to create internal and external modes of cooperation. There is a certain form of individualism that can mitigate against creative use of external supports such as represented by TESSA. (p133)

As a result of this study, I now understand why this matters. It has been argued (Rincón-Gallardo & Fullan, 2016) that effective collaboration can enhance professional capital and ‘become a force for improvement in the whole system’ (p6). By ‘effective collaboration’ they mean ‘the act of working together with a common purpose’ (p6). The lack of collective ‘buy in’ to the LCE agenda among this group means that a common purpose with respect to pedagogic change (and therefore a reason to engage with the TESSA OERs) does not yet exist. Engagement with the TESSA network has provided some of the elements required for effective collaborative networks (free resources, new partnerships and outward connections), but in the absence of some of the others (collaborative inquiry, flat power structures, inward connections and relationships based on trust) means that networks are not sustained (ibid).

The view of knowledge about teaching that emerges from the literature, as socially constructed in a particular cultural context (see Chapter 4), implies a model for collaboration based on the idea of ‘communities of practice’ (Wenger, 1998), in which learning is seen as a joint enterprise of negotiation and reflection, taking place through mutual engagement in practice, with all participants being valued equally. The evidence from this study suggests that the conditions required for a ‘community of practice’ (engagement in action, shared knowledge, interpersonal relations) (Wenger, 1998) are not present among this group. I suggest that the hierarchical nature of the relationships, and the lack of dialogue around the substance of what they do, make ‘collective action’ in the direction of a more learner-centred approach problematic.

My data suggest that two participants (Frank and Paxima) did have an individual disposition towards pedagogic change (Pawson and Tilley, 1997), as they both gave examples of ways in which they work with students. Paxima described her attempts to influence other colleagues and Frank talked about his frustration in trying to influence others. However, the evidence suggests that this is not enough to bring about collective pedagogic change. I suggest that it highlights the importance of ‘discursive structures’ – the collective dialogue around the ideas that underpin the activities of the professional group – and providing opportunities for these to be surfaced and

discussed, in order to generate a collective incentive for change. Individual incentives are not enough.

The lack of emphasis on collaboration also extends to the course with students having very little opportunity to discuss and analyse teaching (Shulman & Shulman, 2007) or to work collaboratively, articulating their vision and understandings of teaching and learning (Kelly, 2006). This was evident in the observed micro-teaching sessions and visits made to schools, in which the 'form' rather than the 'substance' of reflection was observed. Students were invited to comment on each other's performance but were very hesitant about doing so (field notes).

If research were discussed in seminars and informal groups, it is possible that more links might be made between the findings from the various projects and the teaching taking place. Engaging with national policy aspirations is difficult, as there is no forum to discuss the issues. This is exacerbated by a lack of experience of schools, and a culture in which it is assumed that everyone has the necessary expertise (David interview). Interestingly, Stephen and Frank made some negative general comments about their colleagues, but neither has been able to influence the discourse in the department. University processes for renewing curricula are cumbersome (Paxima interview), with the result that the course outline and assessment procedures go unexamined.

However, the data show that this department takes TP very seriously, and all my participants visit many schools every year and watch student teachers teaching lessons. I suggest that if there was more opportunity to share and analyse their experiences, then they would have opportunities to develop their own PCK and make their own teaching more relevant to students.

7.4 The implications for pedagogic change

Pedagogic change at all levels of the system, is required in Africa in order to improve the quality of children's experiences in school (Alexander, 2008; Bold et al., 2017; Westbrook et al., 2014).

Schweisfurth argues that LCE has the potential to deliver improvements, highlighting three justificatory narratives: cognition, emancipation and preparation (2013). My analysis of Government documentation showed that policy aspirations in Kenya are consistent with this view (MoE and MoHEST, 2015).

In Chapter 4, I presented a model for implementing change (May & Finch, 2009), based on four generative mechanisms: coherence, cognitive participation, collective action and reflexive monitoring. Here, I consider the implications of this model for pedagogic change, in the light of the evidence.

May and Finch suggest (2009):

Coherence means that a practice – an ensemble of beliefs, behaviours and acts that manipulate or organise objects and others – is made possible by a set of ideas about its meaning, uses and utility; and by socially defined and organised competencies. (p542)

The lack of congruence between the view of the nature of knowledge about teaching that prevails in this institution (the first causal mechanism) and that implied in LCE, alongside the lack of opportunity to ‘socially define’ meaning to the policy (second causal mechanism), make establishing ‘coherence’ between current practices and new policies challenging. May and Finch are not saying that the new practices have to align with current ones; rather, that new practices are made possible through collective agreement about what they mean, how they work, and the potential benefits. The implication of this study is that in order to achieve coherence, some of the embodied structures need to change, in particular the curriculum and the ways in which student teachers are assessed. For example, the exam paper asking for a ‘table of specification’ for a test did not examine whether the STs were able to compose different types of question, which is much more important than just knowing that they need to include different types of questions.

Paxima talked about the reluctance of her students to engage in pair work and group work. But her reaction to the difficulties was to send them for counselling about how to work in a group, rather than seek guidance herself. Meaningful collaboration needs to take place, in order to tackle these issues, to reach a shared understanding of LCE in this context and, therefore, to recognise the need to change some of the constraining, embodied structures. In order to assess teaching from an LC perspective, an observer needs to focus on the learners and the teacher (Schweisfurth, 2015); the current departmental documentation used to assess teaching focuses almost entirely on the teacher. The curriculum presents teaching as unproblematic and rule-based (knowledge for practice); LC teaching requires the teacher to analyse, reflect and respond to the cultural context (knowledge of practice) (Cochran-Smith & Lytle, 1999). The data show the implication for pedagogic change of only focusing on ‘knowledge for practice’.

‘Cognitive participation’ involves actors in ‘interpreting and “buying in” to’ (May & Finch, 2009, p543) the new practices. It is missing from some accounts (Wedell, 2009) but, although not named as such, is recognised in others (Hennessy et al., 2016). Hennessy et al. refer to the importance of making available to teachers involved in pedagogic change ‘theoretical knowledge about learning’ (p400). This could perhaps be interpreted as ensuring ‘cognitive engagement’ with the pedagogic changes being suggested.

I suggest that ‘cognitive participation’ in the context of pedagogic change in teacher education involves understanding the nature of knowledge about teaching. Once it is accepted that teaching cannot be reduced to a set of rules then alternative modes of assessment, and therefore alternative approaches to teaching will be sort.

When we embarked on TESSA SS, engaging with TEs (from five countries) seemed to be a good way of establishing 'coherence'. I ensured that the writing team spent time coming to a shared understanding on how children learn science (thus engaging with the theoretical underpinnings of the desired pedagogy (Hennessy et al., 2016)). The view that emerged strongly from the writing team was consistent with the discursive structure highlighted in this study – a social constructivist model of student learning – and is embedded in TESSA SS. Despite these efforts, although my colleagues talk enthusiastically about the TESSA SS OERs, they do not see them as directly relevant to their own work with student teachers.

This study has highlighted the fact that the 'cognitive participation' for TEs is perhaps not about 'learning' but rather is about 'knowledge'. Paxima, Frank, Stephen and Henry all expressed a strong commitment to social constructivist views of learning, which are consistent with Schweisfurth's 'minimum criteria'. On this basis, I hoped that they would be enthusiastic advocates for TESSA SS OER. However, the evidence suggested that they find it difficult to convert these ideas into actions in their own practice. For example, they all supported the idea of discussion amongst students, but once group work is reduced to a set of complicated behaviours (Stephen), dismissed as impractical in a large class (Henry), or requires student counselling for it to work (Paxima), then discussions facilitating the co-construction of knowledge about teaching by students is unlikely to take place. My argument is that for teacher educators to understand the 'how' of LCE they need to take a more flexible view of the nature of knowledge about teaching and understand that 'what works' is subjective and depends on the context in which a teacher is working. I suggest that if students have more opportunity to talk, and develop their own understandings, TE will become more aware of the knowledge and experience they bring to teaching. They are then more likely to trust student teachers to develop their own solutions to problems and difficulties, and will have the opportunity to learn from them.

The reason that TESSA is not as widely embedded within the TESSA network as I might have hoped is the cognitive dissonance it produces for TEs who see knowledge about teaching as objective, to be presented to students as a set of rules and guidelines, and the lack of collaborative mechanisms through which to explore this dissonance. TESSA does not naturally fit into course outlines – PCK does not feature, and the time allocated to topics such as group work is too short to allow for detailed consideration of the issues involved. TESSA presents possibilities for classroom activities rather than detailed lesson plans. Interpretation is needed, for which a mind-set consistent with a socio-cultural view of the nature of knowledge about teaching is required.

'Collective action' involves the collective 'investment of effort around the practice at play' (May & Finch, 2009). My data show that TEs value their autonomy and do not habitually discuss the

details of their work (beyond who will take which topics in the course outline), making ‘collective action’ problematic. The hierarchical relationships, linked to age and experience, also mitigate against the sort of ‘collective action’ required, especially (as David suggested in his interview) as it is the younger lecturers who have the ICT skills and access to other communities that could support ‘cognitive participation’ and ‘collective action’; yet it is difficult for them to engage professionally with more experienced colleagues (David and Paxima interviews).

The fourth generative mechanism is ‘reflexive monitoring’ – the continuous evaluation of the ‘patterns of collective action and their outcomes’ (May & Finch, 2009). One of the embodied structures is the evaluation of teaching on the course by the students. But the evidence is that this is considered on an individual basis through the performance-management system and that lecturers may change unfavourable evaluations (Frank interview). Paxima is trying to introduce a process to assess the quality of student teachers’ teaching on TP, through the introduction of a questionnaire for TP supervisors. She presented the findings back to her colleagues, highlighting the need for student teachers to actively engage learners and the TESSA OERs as a way of helping them to do this. This is a good start and has resulted in a few more ‘TESSA champions’ (Paxima interview) but no systemic change as yet.

Overall, therefore, based on this model for change, the causal mechanisms identified in this study perhaps suggest why ‘the history of the implementation of LCE in different contexts is riddled with stories of failures grand and small’ (Schweisfurth, 2011, p425).

7.5 TESSA as a causal mechanism

In Chapter 6, I concluded that TESSA has the potential to be a causal mechanism but is not yet activated. I proved through a text analysis that the TESSA SS OER model a view of teacher learning consistent with the ideas set out in Chapter 4, and a view of student learning consistent with the principles of LCE and policy aspirations (Stutchbury, 2015). Through modelling a social view of knowledge about teaching, in which knowledge about teaching is constructed through participation in social activity in a particular cultural context, the TESSA OERs have the potential to disrupt current beliefs.

It is perhaps not surprising that TESSA does not fit into existing structures; it does not provide right answers, but rather a set of possibilities for action, leaving it to the teacher to select, adapt and use the ideas that they see as relevant to their context. However, it could provide material to discuss and therefore provide a reason to collaborate. It is possible that the new school curriculum (implemented in primary schools in January 2018) could ‘activate’ this causal mechanism by providing a necessity for change; the evidence from this study is that knowledge of, and belief in, social constructivist approaches to student learning is not enough.

We have found that when teachers use TESSA materials, even very small changes in practice produce new responses from learners. Over time, this encourages further changes in practice and, eventually, changes in attitudes towards learners, and a demand for CPD (Harley & Simiyu Barasa, 2012; Murphy & Wolfenden, 2013; Stutchbury et al., 2018). Within the context of a similar project (Teacher Education through School-based Support in India – TESS-India), this model of change has been conceptualised as *access* leading to *participation* leading to *innovation* (Wolfenden, 2015). For teachers, participation (trying new approaches) has been shown to lead to innovation as a result of the new responses elicited from learners (Murphy & Wolfenden, 2013). For TEs, this study suggests that the model of change is perhaps more complicated. Adult learners (student teachers) respond differently from children and are perhaps more likely to politely conform or, as Paxima found (Paxima interview), object to having more demand placed on them (Schweisfurth, 2013). This study suggests that the embodied and discursive structures act to constrain participation beyond telling student teachers and teachers about TESSA OERs, and that achieving ‘cognitive participation’ in the desired practices (LCE) requires a paradigm shift with respect to the conceptualisation of knowledge about teaching.

Research (Wolfenden, et al., 2017) and experience suggest that the uptake of OER in general and TESSA in particular is ‘still fragile, confined to a few converts working independently or with one or two collaborators within ...institutions’ (p277). It still relies on individual agendas and intentions. Amongst my participants, Paxima and Frank have engaged with TESSA OER and are the most genuinely learner-centred in their outlook. Both provided examples of how they work with students. But Frank has become disheartened over the years and has looked outwards, working nationally and internationally rather than in his own institution. Paxima, is working to influence people younger and less experienced than herself. The question arises therefore, what could be done to influence the other participants? As I will demonstrate in Chapter 8 in the latest phase of TESSA we have started working with Governments in the hope that the ‘conducive circumstances’ referred to by scholars of evaluation (Pawson and Tilley, 1997) will be created through institutional requirements. We are also targeting teaching practice as a vehicle for change, rather than the teacher education curriculum. This is where discussions about teaching can and do take place, and, as Stephen acknowledged, the co-construction of knowledge about teaching can happen. Our theory is that if these discussions are strengthened then the change of mind-set (cognitive participation) required to tackle the constraining issues of assessment and course outlines (embodied structures) will be created. Endorsement by Ministries of Education, or a set of national teaching standards, could provide the incentive for people like David, Stephen and Henry to engage with new material like TESSA OER, provided these are accompanied by changes in the social structures to accommodate new requirements. Engaging with TESSA OER has the

potential to support teacher (and teacher educator) learning (Stutchbury, 2015), and to bring about changes in practice that could eventually lead to new understandings.

7.6 Reflections

CR is 'theory driven' and requires us to be critical of the social theories that we use. I have grappled with ideas about LCE since I started working on TESSA in 2010, and have found Schweisfurth's (2013) analysis to be helpful. She conceptualises LCE as a set of continua, which is consistent with the TESSA model for change (small steps), but crucially misses out the principle of fixed intelligence with the idea that ability is innate at one end and that all children can learn, given the right support, at the other. As I explained in Chapter 4, in my work with teacher educators and teachers I have found her definition (which focuses on learners) to be unhelpful. However, her 'minimum criteria' are very powerful both in terms of conceptualising and operationalising LCE. They shaped much of my analysis; they are the basis of a very successful 'quiz' on LCE (Appendix 9) that I have used in the TESSA MOOC and all over Africa; and they are set out for teachers in a set of resources that will be rolled out across the whole of Zambia (ZEST, 2018).

I first came across 'Normalisation Process Theory' (May & Finch, 2009) as a way of thinking about implementation in 2011. Although developed in the field of healthcare, I have come to the view that it has significant potential in our field. The four generative mechanisms raise questions which have framed the TESSA strategy (2016-2019) and the design of a new TESSA-based project, *Zambian Education and School Training (ZEST)*. The concept of 'cognitive participation', in particular, provides a focus for people looking to implement change, and the question 'what does cognitive participation look like in this context?' would, I suggest have wide applicability across projects. 'Coherence' involves being explicit about the ideas which underpin current practices (discursive structures), and those which underpin the new desired behaviours. Cognitive participation involves making explicit, and reaching a shared understanding of, the new discursive structures.

In order to construct my interview schedules, I drew heavily on the ideas about teacher educators' professional identity set out in Chapter 3. The available literature on PI comes from the USA, Europe, Australia and New Zealand. However, there are many consistencies with my data, in particular, the tension between being a teacher and a researcher that is highlighted in the literature (Murray & Kosnik, 2011; Murray & Male, 2005) is also evident amongst this group, and causes some frustration (David interview). However, the PI of my participants is also affected by their position in the hierarchy. David still feels like an outsider after three years (David interview); Paxima feels that her influence is limited to those younger and less experienced than herself; Stephen is constrained by the view that people have of him as being 'a godfather' (Stephen

interview); and Henry's interview was dominated by a sense of self that is mediocre, middling and not influential. This is not reflected to the same extent in the literature examined in Chapter 4.

7.7 Summary

In this chapter, I have located my findings in the context of the wider debates about teacher education in developing contexts. The focus on 'knowledge for practice' (Cochran-Smith & Lytle, 1999) pervades every aspect of learning to teach and has given rise to disconnections between beliefs (a commitment to social constructivism as a model for learning science) and practice. I have also highlighted the importance of establishing collaborative spaces in which new ideas can be explored, tested and adapted for use in this context (O'Sullivan, 2004; Vavrus, 2009). By conceptualising change in terms of four generative mechanisms (coherence, cognitive participation, collective action and reflexive monitoring) (May & Finch, 2009), I have identified 'cognitive participation' as a crucial step and have suggested that in this context it involves 'buying into' the notion that knowledge about teaching is subjective and socially constructed in particular cultural settings. The methodology for this study was underpinned by theories of LCE and PI. I have found both to be useful, but lacking in certain respects for this context. In the final chapter, I consider the wider implications of this study, the impact on my professional practice, the opportunities for further research, and the methodological contribution I have made to the field.

8. Conclusion

In this chapter, I consider my contribution to knowledge in the field of teacher education, and the quality of the study. I reflect on the appropriateness and value of critical realism as a research paradigm for small-scale qualitative studies such as this, Scott's (2010) typology for examining social structures, and the implications for larger-scale studies. Finally, I describe the impact of this study on my professional practice and consider opportunities for further research which arise from this study.

8.1 Review of research questions

This study set out to answer three research questions:

RQ 1: What structures enable and constrain teacher educators in shaping their agency and developing their pedagogy in line with policy aspirations?

RQ 2: What are the teacher educators' perceptions of their agency in relation to their role as a teacher educator in this institution?

How do they manage the tensions that arise between different aspects of their role?

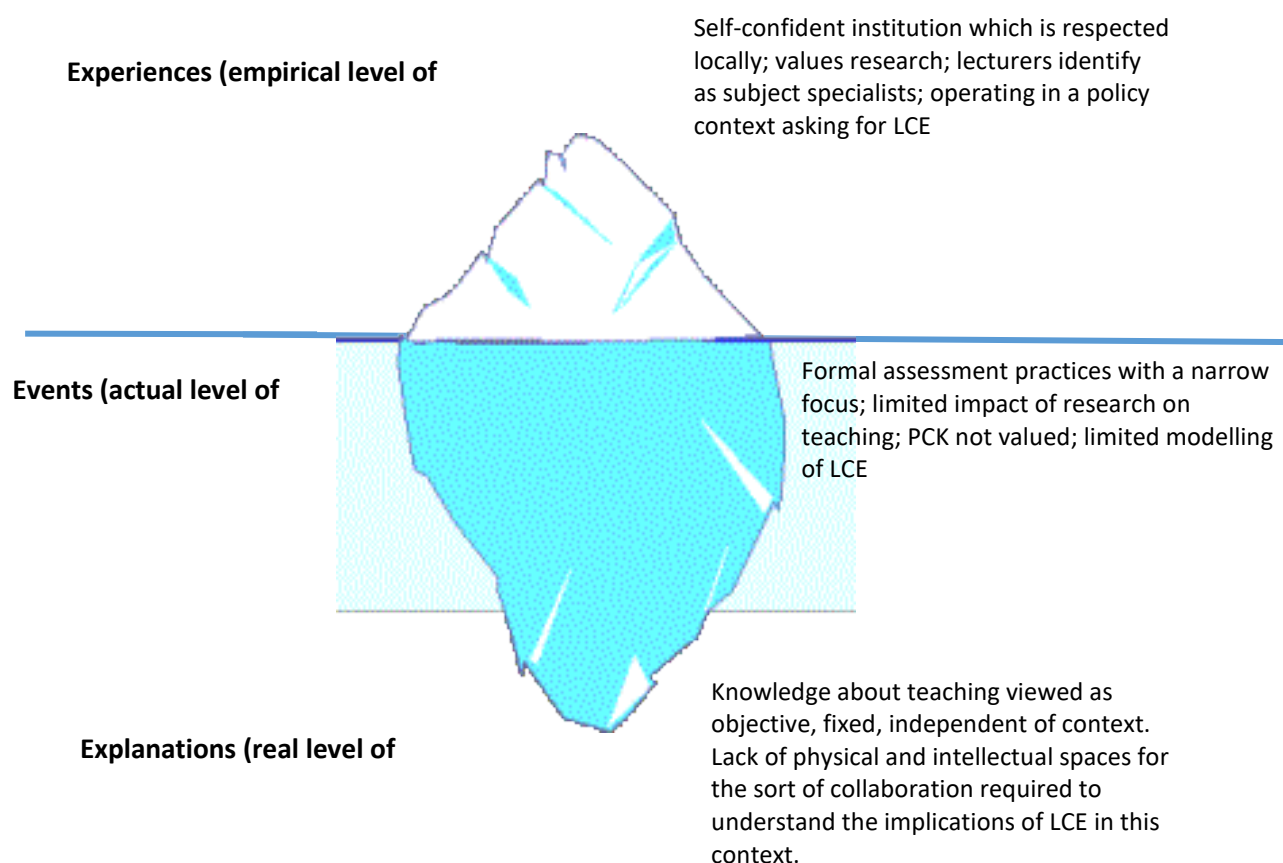
To what extent are they able to exercise agency in their role as a TE?

RQ 3: What are the underlying causal mechanisms operating in this situation, which impact on the capacity of individuals to embrace pedagogic change?

The first two questions are considered in Chapter 6 (sections 6.3.1.4 and 6.3.2.6) and are summarised in Figure 8.1. In brief: TEs are constrained by the curriculum, the assessment system, a lack of resources, the way in which teaching is organised and cultural hierarchies. The assessment system focuses on the successful acquisition of theoretical 'knowledge for practice' and on what teachers do, rather than on the impact of what they do on learning. Classes are large and resources (such as access to projectors and IT) are scarce. Teaching methods and subject knowledge are taught separately and despite their strong professional identity as scientists, the evidence from the observations in particular, is that they don't teach pedagogical content knowledge. Cultural hierarchies, alongside full timetables, make genuine collaboration to discuss issues of teaching and learning, difficult. My participants are empowered by their autonomy and the freedom to develop and enact their own view of teacher learning (RQ1). My participants are agentic in different ways. The evidence suggests that three (Paxima, David and Frank) are relatively successful in pursuing their own agendas. Paxima's agenda is linked to policy aspirations for learning and pedagogy, and she is successful in using available social structures to promote her agenda. David expressed various frustrations about his role as a physics education lecturer

and has sought alternative opportunities that will provide the sort of teamwork he is looking for. Frank supports pedagogic change, but his efforts have gone beyond the university. Stephen has some ideas consistent with pedagogic change, but is constrained by the hierarchical structures. For Henry, the structures provide an excuse for him to maintain his mantra 'do as I say, not as I do', which limits the prospects for pedagogic change (RQ2).

Figure 8.1: Summary of Findings



As a result of the analysis, I identified four 'disconnections' that underpin the work of this group of teacher educators – aspects of the situation which, on investigation, are not consistent with the 'experiences' (findings at the empirical level of reality).

The evidence supports the identification of two causal mechanisms which impact on the prospects of teacher educators as agents of pedagogic change are (RQ3): the view of the nature of knowledge about teaching and the lack of collaborative spaces (both intellectual and physical) for professional dialogue about teaching and learning. TESSA is a causal mechanism which has not been activated. It is possible that the new school curriculum (due shortly) will provide a driver for the more pro-active use of TESSA OERs to support teacher education in this institution.

8.2 The authenticity of my findings

In the context of a qualitative study, the concepts of trustworthiness, credibility and authenticity are more relevant than validity and reliability (Seale, 1999). Nevertheless, as described in Chapter 5 (section 5.6.1), I took steps to ensure internal, concurrent and content validity (Cohen et al., 2017), and the impacts of my findings on my professional TESSA activities are indicative of 'external validity'. The analytical process is recoverable (Checkland & Holwell, 1998), ensuring that my findings are as reliable as possible. By using an analytical framework developed in developing contexts (Schweisfurth's minimum criteria), I have ensured 'cross-cultural validity' (Cohen et al., 2017, p259)

I have been working in this field for nearly seven years, and to some extent authenticity comes from the fact that the findings from this study are not surprising; it is possible that I would have come to similar conclusions as a result of on-going reflection and reflexivity, especially with respect to PCK and LCE. However, this study has provided an evidence-base and has enabled me to identify the root of the disconnections in this particular institution. The significance of the way in which student teachers are assessed, and the importance of research to my participants, emerged from the data, and documents associated with both these issues provided strong evidence for the first causal mechanism (the nature of knowledge about teaching) in particular. These aspects of the role of a teacher educator in SSA have not been a focus of our development work thus far. This study highlights the potential for more collaborative research to introduce new perspectives and the importance of challenging how student teachers are assessed if sustainable change is to be achieved. Experiences across the TESSA network and of attending conferences in sub-Saharan Africa suggest that the explanations I present here have applicability beyond this institution. They have impacted positively, for example, on my work in the current phase of TESSA.

The study could have been strengthened if I have been able to stay longer, interviewed more participants and observed more teaching. It would have been interesting to hear the perspective of the student teachers currently on the course, or in the early years of their career. However, given the constraints of undertaking a professional doctorate alongside full-time work, and taking account of the ethical issues highlighted in Chapter 5, I have made a contribution to knowledge in the field, both in terms of the explanations I propose and the methodology I developed. While I am cautious about generalisability, I suggest in the next section that a focus on 'knowledge' as well as on 'learning' at different levels of the system could be fruitful when considering 'quality' in the field of educational development.

8.3 My contribution to knowledge

This study makes two significant contributions to knowledge. The first concerns learning relevant to the field of teacher education and the second concerns the use of CR as a theoretical framework.

The explanations (underlying causal mechanisms) that I am proposing reflect much of what has already been written about teacher learning (Borko, Liston, & Whitcomb, 2006; Cochran-Smith & Lytle, 1999; Putnam & Borko, 2000; Shulman & Shulman, 2007). This study demonstrates the importance of views of the nature of knowledge about teaching and collaboration, as aspects of teacher learning, and the consequences of not embedding these ideas in teacher education. Much attention has been paid to ideas about social constructivism as a theory of learning that is relevant to LCE; this study shows that the reason that teachers find it difficult to put theory into practice is the ontological disconnect between the desired practices and the prevailing discourse.

When asked by colleagues or family what I have found out as a result of my EdD, I find myself responding ‘it is not about learning, but about knowledge’. This study suggests that an explicit understanding of the nature of knowledge about teaching needs to inform the debate about how to bring about pedagogic change. Policy aspirations for LCE and the publishing of new curricula calling for teachers to teach problem-solving, critical thinking and creativity are underpinned by a view of knowledge about teaching that it is subjective, socially constructed and contextually determined. This contradicts the view of knowledge about teaching that prevails in this university, and elsewhere in sub-Saharan Africa (Akyeampong, 2017; Vavrus & Bartlett, 2012). Work in Zambia, for example, carried out as part of the TESSA programme during 2018 suggests that the civil servants based in the Curriculum Development Centre (CDC) – who have responsibility for the revised school curriculum – do not themselves understand the implications of what they have written in the curriculum documents for the training and preparation of teachers. They are reluctant to engage with TESSA OER as they did not write them and see using or advocating for OER as a potential threat to their own credibility as curriculum experts.

Understanding how learners learn is clearly important. The international debate surrounding educational development and the Sustainable Development Goals (SDGs) is calling for a focus on ‘quality’ and ‘learning’ (Alexander, 2015; Barrett et al., 2015; Pritchett, 2013). Barrett et al. (2015) highlight the complexity around the conceptualisation of, and hence the measurement of, learning. Much of the debate is around the definition of learning goals and how these might be measured, and much of the funding available for educational development work is contingent on proving that learning gains can be made. This leads to a situation in which funders define the outcomes, which will not always be suited to context (Barrett et al., 2015).

In any given classroom, learning will be taking place in many different ways simultaneously, and it is possible to argue in favour of many interventions on the basis of the likelihood that they will impact on learning. Often, interventions in educational development involve providing teachers with a set of prescribed instructions, or lesson plans, based on so-called 'best practice' (e.g. Lesson Study in Zambia; USAID, Read to succeed). The assumption underpinning these interventions is that there is a 'right answer' to the question 'how do children learn?' and therefore a 'right way' to teach particular topics, or to teach children how to read. Often, individual projects are able to demonstrate learning gains, but the evidence from international data such as the Programme for International Student Assessment (PISA), and from Schweisfurth's review (2011), is that these are often not sustained. There needs to be a recognition perhaps at a policy level, that 'what works' in education needs to be determined in context and will always be culturally situated.

This study suggests that as well as a focus on 'learning' (Tikly, 2015) in different contexts, a public discussion of the nature of knowledge about teaching is necessary. There is no right answer to the former, whereas it might be possible to secure a consensus around the latter which could inform the design of international development projects.

In a recent policy paper the Department for International Development (DFID, 2018) in the UK calls for a focus on teachers and what they do in their classrooms. This is promising and I suggest that it needs to start with a debate among policy-makers about what teachers need to know and how they come to know it. Prospective projects could then be judged in terms of the extent to which they support teacher learning by supporting teachers in building collaborative networks through which to co-construct knowledge (and therefore solutions) relevant to their context. This does not require a foray into philosophy and the nature of knowledge (which would be unlikely to engage policy-makers or practitioners) but, as I will show in section 8.4, can be operationalised in international development work.

My second contribution to knowledge concerns the use of CR as a framework for this study. As I became interested in CR, I became aware that the impenetrability of much of the literature and the apparent philosophical complexity make it an unpopular choice as a paradigm for a small-scale study. Also, many of my colleagues (interpretivists) are uncomfortable with the concept of a 'social reality'. However, I have found a way of explaining the key tenets of CR and believe that it has applicability to small and large-scale studies in the field. When I started this work in 2015, little CR research was available in the field of educational development, but I was inspired by Tikly's article (2015) and found a number of studies in other fields to guide me in designing a methodology. During the study, I have been reading more and developing my understanding of CR. I have come to a number of conclusions, concerning:

- Scott's interpretation of CR;
- the implications for small-scale qualitative studies;
- the place of 'culture' and how it relates to Scott's typology for social structures;
- the application of CR to large-scale studies.

8.3.1 Scott's interpretation of CR

The field of 'critical realism' spans many disciplines and my conclusion is that authors within these fields are not learning from each other. I have found the work of Scott (2005, 2010) to be particularly helpful in operationalising CR. However, although he writes from an Education perspective, his contribution is at a theoretical level and I have found no practical accounts of how his concepts can be used. Practical studies in other fields which draw on CR (eg Bygstad et al., 2016; Davis, 2013; Fletcher, 2016) make no reference to the work of Scott. This has provided me with the opportunity to examine the implications of his theoretical contributions and two points have emerged.

Firstly, I have found the concept of 'discursive structures' to be particularly helpful. This is the set of ideas which underpin the work of a group of professionals. In implementing any sort of educational change, I have come to the view that accessing the existing discursive structures and understanding how they align with the ideas underpinning the new, desired behaviours is hugely important, and could provide insights to inform professional development activities. It is the failure of policy makers to take sufficient account of existing discursive structures which is perhaps most likely to limit the successful implementation of new curricula or new pedagogy. In this study, it was the absence of explicit collective discussion around teacher learning – even though some individuals had clear ideas – that mitigated against the uptake of new pedagogy and the use of TESSA OER to support these new ideas. It also means that the embodied structures (such as the examination system and course outlines) that constrain agency with respect to new pedagogy, go unchallenged.

Secondly, Scott suggests that actors will interact with existing structures in different ways, depending on a number of factors. He lists four 'modes of vertexicality' (which I interpreted for TE) as:

- professional knowledge for teaching and of teaching;
- the impact of embodied and institutional structures;
- the possibilities for introducing new ideas or new practices;
- how TEs interact with each other and the extent to which ideas spread within the group.

In the context of my data, these all make sense. However, as a result of working closely with these five individuals, I would add 'individual intention' as a key factor which determines how an actor

will interact with, and change, the prevailing social structures. Individual intention covers attitudes, values and beliefs developed as a result of taking part in the social world, and determines what an individual will notice, how they discriminate and how they make judgements about how to act (Checkland & Casar, 1986). In this study, I took account of this through consideration of professional identity. However, inclusion of a fifth 'mode of vertexicality' which recognises the importance of individual intentions and motivations for change would strengthen Scott's theory.

8.3.2 The implications of CR for small-scale qualitative studies

One of the reasons I gave for choosing CR is that it enables the researcher to go beyond the thick descriptions of interpretivism and seek explanations (Tikly, 2015). An interpretative study designed to understand the work of a professional group would have probably identified the four disconnections. But in order to seek explanations, we have to assume that there is 'something' to find out: the realist ontology enables us to make inferences. However, this approach is not without difficulties, and in particular produced some ethical dilemmas.

Research like this has the potential to be quite intrusive. This resulted in me dropping 'structures of agency' from my analysis and focusing on the ways in which embodied, discursive and institutional structures enable and constrain agency. It would be difficult to carry out a study like this in an institution in which I was less well known, as it takes time to establish the sort of trust that enabled my participants to be open and honest with me. There is no doubt that some of the 'causal mechanisms' constraining or enabling change in any institution will involve the actions of specific individuals, but it is not the place of outsiders to investigate those, unless specifically invited to do so. Maintaining anonymity is difficult given the need to provide a detailed description of the context. The heavy reliance on documents means that I will need to remove a number of references before this thesis goes into the public domain, and I have purposely provided very little information about the location of the university. It is still likely, however, that other members of the TESSA network could identify the institution concerned.

The relationship that I have with my participants is such that I could feed back my findings in full – including the causal mechanisms and the impact they are having – but I would prefer to do this in a face-to-face setting. In the meantime, I will provide them with a written summary. I would want to provide some sort of mediation before they read this account of my study.

One of the commitments I made to my participants at the start of the project was to provide a platform for the perspective of TEs in Africa. Lunenberg et al. (2014) have provided a synthesis of the literature about the roles, behaviour and professional development of TEs, drawing on 137 journal articles, of which just two are from Africa (and they are from South Africa). They provide a

framework which describes the activities of TEs and use this to make suggestions concerning the sort of professional development required. I have enough data to contribute to this debate from the perspective of this professional group and intend to do so, including them as authors.

8.3.3 The place of 'culture' and Scott's typology for social structures

One aspect of CR that has caused me a great deal of deliberation is the place of 'culture' within a CR framework. Archer (1998c) separates 'agency', 'structure' and 'culture' (whilst recognising they are intimately related) for analysis purposes. Drawing on her work, some 'users' of CR do the same (e.g. Hodgkinson-Williams, et al., 2017; Priestley, 2011). They discuss attempts to bring about change and treat 'culture' as being separate from 'structure'. They define 'structure' in terms of institutional policies, systems, resources and relationships between actors. What Scott refers to as 'discursive' structures, are considered to be 'cultural forms' and therefore part of 'culture'. The cultural forms include ideas that actors hold, and the ideas underpinning the intervention being studied which may or may not migrate from setting to setting.

My framework sees 'culture' as something which emerges as people take action in a particular social setting and conceptualises the ideas underpinning the work of a group of actors as a 'discursive structure' (see Chapter 3). The implication is that changing the culture of an organisation is not a deliberate act and has to come from within, through a focus on structure and agency.

I prefer this for two reasons. Firstly, the word 'discursive' implies that the ideas are visible in social interactions (which I think they are), evolving rather than static, and not separable from the relationships, institutional and embodied structures. Secondly, in our work with TEs, engaging with their collective (or individual) discursive structures is likely to be the most fruitful way to be able to work together to bring about change. This is exactly what I did in TESSA SS: I tried to find out how my colleagues viewed science learning and effective science teaching as a basis for our work. (I now realise, however, that the focus should perhaps have been teacher learning and the nature of knowledge about teaching). Finding out about the relationships, systems and processes (institutional structures) is important to understand the context, but outsiders such as curriculum developers or project leaders, cannot expect to change them. Priestley (2011) suggests that the implications of his analysis of the uptake of curriculum change in Scotland is that policy-makers (part of the cultural system) need to be aware of the structural factors which may enable or constrain agency – the institutional structures, resources and relationships. I suggest that this is impractical over large numbers of schools, and that it would be more effective for policy-makers to engage with the 'discursive' structures – the ideas about teaching and learning – that prevail in schools, and use what they find out to design effective professional development. By separating 'discursive structures' from other social structures, Priestley loses sight of the disconnection

between the ideas underpinning the new curriculum and the prevailing ideas about teaching and learning in many schools. This disconnection constrains the implementation of a new, and quite radical, curriculum (Priestley, Minty, & Eager, 2014) but his recommendations to policy-makers miss the point.

Likewise, Hodgkinson-Williams, et al.,(2017) highlight a number of constraints around the adoption and use of OER, but in their analysis miss the possibility that prevailing ideas and attitudes towards learning and teaching, and the sharing of resources, might be a significant constraint.

8.3.4 The application of CR to large-scale studies

The potential of CR in general and of the concept of ‘discursive’ structures in particular, as a way of thinking about large-scale issues (the effectiveness of the educational systems), was also highlighted to me by an experience in the UK.

At the United Kingdom Forum for International Education and Training (UKFIET) conference (2017), I attended a seminar led by the Researching Improvements in Systems of Education (RISE) programme (<https://www.riseprogramme.org/>). The group introduced a ‘four-by-four diagnostic’, which was a framework to help them analyse the different ‘levels’ of an education system – policy, districts, zones and schools – and understand why some systems are more successful than others (Pritchett, 2015). They analyse each level from four perspectives: delegation, finance and support, information, and motivation. These perspectives could be interpreted in terms of structures: institutional structures (delegation and information); structures of agency (motivation); and resources (finance and support). Missing from the list – and therefore a significant weakness in the framework – is ‘discursive’ structures (the ideas, values and beliefs that underpin the work of ‘agents’ at all levels of the system). I suggest that this is important because any education system will be underpinned by assumptions about the nature of knowledge, teaching and learning. Many initiatives fail as a result of disconnections such as a curriculum built on constructivist principles and an assessment system built on a view of knowledge as fixed, external to the knower and behaviourist principles of learning.

The theoretical basis for the ‘four-by-four diagnostic’ was not discussed, although the implication throughout was that there is something to find out about education systems (a realist ontology), but what is found out will be interpreted differently in different contexts (a relativistic epistemology). This is consistent with CR; and, by acknowledging this and including ‘discursive’ structures as part of the diagnostic, both the credibility and the practicality of the framework could be improved. In 2017 this framework was still under discussion, and as far as I know the

final version has not yet been published (email 08/11/2018 from information@riseprogramme.org).

8.4 The implications for my professional practice

The realisation that ‘cognitive participation’ might be about ‘knowledge’ rather than ‘learning’ has impacted on my own work as TESSA Academic Director. Despite the challenges, I remain committed to the belief that if teachers’ pedagogy is to change in line with policy aspirations, then teacher educators need to change as well, and that TESSA OERs (with practical examples of classroom practice) have the potential to support these changes. I believe that TEs have a responsibility to be agents of change (Cochran-Smith, 2006), and this study has provided insights and a better understanding of what this might involve. It has certainly highlighted some of the challenges (embodied structures and certain social norms), but also given me ideas about how to leverage the most from the opportunities that we have. In this institution, Paxima had identified TP as a lever for change and designed a questionnaire for TP supervisors designed to highlight the need for student teachers to receive more support in ‘active teaching’ (Paxima interview and field notes). Stephen also identified the after-lesson discussion between the tutor and the student teacher as an opportunity to co-construct knowledge about teaching (Stephen interview and field notes). As a result of these insights, working with my senior project manager, the TESSA co-ordinator in Zambia, and a Principle Officer (with responsibility for the colleges of education) in the Ministry of General Education, we re-designed our plans for the final year of the current TESSA grant. We have produced a ‘Zambian School Experience Guide’, which will support TP, by bringing together a team of TESSA MOOC graduates to version the TESSA TP Supervisors Toolkit for the Zambian context. This is more likely to result in interest in TESSA OERs from TEs than further attempts to influence the college curriculum. The toolkit also foregrounds ‘knowledge of practice’ and ‘knowledge in practice’. As teacher educators become more aware of the way in which student teachers develop their knowledge of how to teach, it is possible that new approaches to the assessment of teaching – and therefore eventually to teaching teachers - will emerge.

There is of course the question of generalisability, and the extent to which these causal mechanisms might apply to other situations. The aim of CR is not to generate generalisable causal explanations, rather to obtain insights which could inform an investigation in a similar setting (Wynn & Williams, 2012). Therefore I am treating these findings as what Bassey (1999) would refer to as a ‘fuzzy generalisation’ – tentative suggestions which may or may not be replicable in other situations, but could provide lines of inquiry in future studies. However, there are other studies which provide some overlap with my findings. For example, in a study in Ghana, Akyeampong (2017) suggests that ‘reform will not succeed without reforming the way in which

teacher educators learn to teach pre-service teachers' (p202), and he highlights the importance of TEs acquiring 'knowledge in practice' and 'knowledge of practice' (Cochran-Smith & Lytle, 1999) (although it is not specifically expressed in these terms). Others have also commented that TESSA has the potential to 'question what is valued knowledge' (Murphy & Wolfenden, 2013, p270), highlighting the disruptive potential of TESSA OERs.

One of the strategic objectives of the current TESSA programme is building the capacity of TEs to embrace LCE themselves. The key activity associated with this objective was designing and running a MOOC for TEs (The Open University, 2017). I was the lead author of the MOOC; and, although it did not include an explicit account of the different ways in which knowledge can be conceptualised, it constantly challenged the notion that there are fixed rules about how to teach (Cochran-Smith & Lytle, 1999; Putnam & Borko, 2000) and highlighted the significance of PCK for student teachers and teachers (Shulman, 1986). Many of the activities explicitly encouraged collaboration by suggesting participants shared responses to a question or task with colleagues. We trained 142 facilitators across Africa, who did the MOOC themselves alongside the people they were supporting, thus modelling what the 'teacher as facilitator' might look like. The impact of the MOOC is still being investigated, but it won the 'Digital innovation of the year (learning)' at the PIONEER Awards in 2018 (The PIONEER Awards, 2018), reflecting the innovative learning design, which was based on operationalising ideas about teaching learning.

The MOOC has also served to provide new ways of collaboration through social media. TEs from the TESSA network have shared examples of activities they have run in their institutions – and one colleague has installed a kettle, some mugs and teabags in her department in an attempt to encourage more conversation between colleagues.

I have also changed the way in which my team and I introduce TESSA to TEs, focusing on supporting them in analysing specific examples from the OERs in terms of teacher learning and student learning. This serves to highlight the fact that there are always alternative interpretations of practice, and encourages adaptation to different contexts. In a recent 'mapping workshop' in Zambia, in which we worked with Zambian colleagues to 'map' the revised primary-school curriculum to the TESSA library, teachers outnumbered Government and college TEs. Although it met with some initial resistance from officials, this was a deliberate attempt to challenge the positioning of TEs as being more expert than teachers because they hold theoretical academic knowledge, and to emphasise the value of the practical 'knowledge of practice' (Cochran-Smith & Lytle, 1999) that teachers hold.

The opportunity provided by this study to explore the literature in depth has also made a significant impact on my practice. Schweisfurth's work on LCE (2011, 2013 and 2015) informs all the workshops I run and was the basis for a week of activity on the TESSA MOOC. I have a much

deeper understanding of the nature of teacher learning, which again is informing our work on a new project which is bringing TESSA to schools in Zambia (Zambia Education School-based Training - ZEST). In ZEST we have specifically worked with Government in the hope that 'conducive circumstances' (for the use of TESSA) (Pawson and Tilley, 1997) will be created through institutional requirements. Likewise, my ideas on implementation (the notions of coherence, cognitive participation, collective action and reflexive monitoring) informed the bid for ZEST and are influencing the way in which we are working. As part of on-going 'reflexive monitoring', we recently completed a 'realistic evaluation' (Pawson et al., 2005) of cohort 1, in which we identified a set of 'programme theories' (reasons why we thought the actions we were taking would yield the desired outcomes) and collected and analysed data in order to explain which theories do seem to be working, and which need to be changed.

Within the International Teacher Education for Development group at my university, my new understandings are influencing my contributions to our regular discussions around our theories of change, and attempts to draw learning across projects to feed into future ones. For example, we have learnt that the TESSA OERs – and others we have produced – need to be mediated for teachers and TEs, and I am doing what I can to ensure that we focus on ways of supporting and encouraging collaboration, and emphasising that learning to teach is about local problem-solving, reflection and flexibility.

8.5 Further research

A number of possible avenues for further research have emerged.

- Many of the course comments on the MOOC implied that pedagogic change as a result of participating was a real possibility; we are investigating the extent to which this is the case. Within the TESSA programme, we are keen to find out more about the practices of TEs, the impact of the TESSA MOOC on practice and the effectiveness of other methods of mediation of TESSA.
- This study highlights the importance of collaborative spaces. The MOOC led to much activity on social media. It would be helpful to explore the long-term impact of this sort of collaboration in general and other possible models for effective collaboration among TEs.
- Tao (2016) combines CR with the Capability Approach, arguing that causal mechanisms are 'within people' (p40) and are the 'beings and doings' that an individual values, and which guide their behaviour. She uses this very effectively to study why teachers are absent, and why teachers use corporal punishment. As the need for pedagogic change becomes more urgent (when the new curriculum becomes a reality throughout the system), this approach could be used for a more in-depth study of the behaviours of TEs, both in universities and colleges of education. My study has revealed aspects of the social

structures which empower and constrain individuals, but it would be interesting to know more about their individual motivations. Tao's approach could be fruitful in this respect.

- I have demonstrated that CR provides a robust framework and analytical tools to support research in this field. As described in section 8.3.3 above, there is an opportunity to use CR to design a large-scale investigation of an education system. Other students in my faculty have expressed an interest in this way of thinking, so I am working with some of them to explore in more depth the potential and limitations of CR in the context of education.

8.6 Dissemination strategy

I have written a short account of my findings for my participants, including some recommendations for practice. I have ensured that these are practical tasks that would be doable in the context. My experience of working with them over a number of years, is that they would appreciate this contribution.

As explained above my findings have already impacted on our work on TESSA. Although I have not been explicit about the importance of the nature of knowledge about teaching (a philosophical debate would not be helpful), I have tackled the issue implicitly through the MOOC, in workshops with TEs and more recently in work with District Education Officials and Zonal In-service Co-ordinators in Zambia.

I presented my theoretical framework at the BERA Special Interest Group (International Education) conference at the University of Worcester in June 2017, and within my faculty in November 2018. At the Distance Education for Teachers in Africa (DETA) conference in Kigali (August 2017), I gave a short presentation exploring the role of teacher educators in Africa, highlighting the aspects of the role that seem to be under-developed and the implications for professional development (Stutchbury, 2017). In 2019, depending on funding available, I hope to present at DETA (July 2019), UKFIET (September 2019) or the Pan Commonwealth Forum on Open Learning (PCF9) in Edinburgh (November 2019).

I am planning three publications:

- An account of the roles and responsibilities of a group of TEs in SSA, drawing on Lunenberg et al.'s dimensions of practice (2014). The dimensions of practice are derived from 137 papers, of which only two are from Africa, so the intention is to analyse my data in terms of these dimensions and provide a voice in this debate for my participants.
- An account of how I used CR in this context, including my analysis framework. I was grateful for some detailed accounts from other fields (Bygstad et al., 2016; Davis, 2013;

Fletcher, 2016; Wynn & Williams, 2012) in designing my own study, and feel I have a methodological contribution to make.

- A paper arguing that the focus on teachers and teaching called for in much of the literature surrounding the SDGs requires an open debate about the nature of knowledge about teaching. In the pages of academic journals, the argument is won (Cochran-Smith & Lytle, 1999; Putnam & Borko, 2000; Shulman & Shulman, 2007). My study demonstrates why these ideas are important, and the consequences for pedagogic change of ignoring them.

The journals I am considering are *Teaching and Teacher Education*, and *Research in Comparative and International Education*.

8.7 Final reflections

I embarked on this study with the intention of making sense of my experiences of working on the TESSA programme, and developing my professional practice as TESSA AD. I brought to the study 20 years of experience as a teacher and nearly ten years working as a TE, and that experience has influenced what I noticed, how I made judgements, and how I interpreted my data. Teacher education is a complex field (Cochran-Smith et al., 2014), owing to the fact that the medium is the message, and too often – particularly in SSA – the message is lost as a result of practices which are not in line with policy aspirations. This study has highlighted two reasons why that might be the case, and vindicates our faith over the last ten years in the TESSA OERs as a potential vehicle for change.

I have engaged in depth with the literature in my field, but have also, through CR, developed a robust framework for analysing the issues and dilemmas that we face.

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Appendix 1: Ethical questions

Questions which informed the ethical analysis

These are based on those presented in Stutchbury & Fox, (2009)

External perspective

- What are the relevant guidelines that I need to follow?
- What are the risks to the participants and the institution?
- What are the norms and roles in this institution which could impact on data collection?
- What do I already know about this institution which could impact on the data?
- Will I be able to collect enough evidence to draw conclusions?
- How will I make efficient use of the resources available?

Consequential perspective

- What are the benefits of doing this research for the wider community?
- What are the benefits of this research for the institution?
- What are the benefits of doing this research for the participants?
- What are the consequences of this research for me as the researcher?

Deontological perspective

- What constitutes 'harm' in this situation?
- How can I avoid harming my participants?
- Have I treated all participants fairly?
- Do they understand that they have the right to withdraw?
- How will I ensure confidentiality?
- Have I explained the research in an appropriate manner?

Relational perspective

- How can I build a constructive relationship with my participants?
- Am I making unreasonable or insensitive demands on any participants?
- Do they appreciate that participation is voluntary?
- How will I ensure that the research is rigorous?
- How will I establish trust and demonstrate respect for my participants?

Appendix 2: Teacher Educator consent form

From:

Kris Stutchbury

Faculty of Education and Languages Studies

The Open University

Walton Hall

Milton Keynes

MK7 6AA

kris.stutchbury@open.ac.uk

March 2016

Dear [Teacher Educator name],

I am writing to invite you to participate in research I am undertaking for the Doctorate in Education at the Open University. The research is focused on the how University Lecturers and Professors support student teachers in the context of current policy aspirations and the realities of schools and classrooms. This document sets out the details of the research. I hope very much that you will be willing to take part.

Further details about the research

Background

The Sustainable Development Goals (SDGs) set in 2015 place a significant emphasis on improving the quality of teaching and learning in schools. University lecturers have an important role to play in this mission. I work in International Teacher Education at The Open University and was formerly the Director of the Open University Post Graduate Certificate in Education (preparing secondary teachers in the UK). I am currently Director of the TESSA project. Through my work on the TESSA project, I have had the privilege of working with colleagues from your university and I am aware that we share the same tensions and challenges in supporting student teachers.

Aims

The purpose of this research is to find out more about the role, identity and practices of teacher educators in African contexts, in order to support our work in TESSA and other international development projects. Most of the published research concerning teacher educators comes from the USA, the UK, Europe, Australia and New Zealand.

I have therefore have two specific objectives: one to better understand the context in which you work in order to inform the work we are doing in the TESSA programme, and the second is to contribute to the research literature on teacher educators by giving colleagues from Africa a voice.

Participants

The participants in this research will be university lecturers and professors with pre-service teachers.

What's involved?

I will be spending a week on the campus. If you agree to take part, you will be asked to take part in two interviews of about 45 mins, and to be observed at work with your students during micro-teaching sessions and during any meetings that you have with colleagues. If time allows, you may be asked to take part in a focus group exercise with your colleagues.

Possible risks and disadvantages of taking part

There will be a time commitment involved for the interviews and I am not able to recompense you for this time. My aim will be minimise the imposition on your time and all the activity will be concentrated in one week.

The interview questions will focus on your own past experience of being a student, a teacher (if applicable) and a teacher educator; on your role and your practice as a teacher educator and the challenges that you face as you carry out that role. I will be recording the interviews.

During the observations I will be taking notes and I might take some photographs to capture an incident that I would like to ask you about afterwards. I am interested in the resources that you draw on and may ask to see your teaching notes, or notes from professional development courses.

All the data will be stored on a secure server; the confidentiality of the data will not be compromised.

Whilst every effort will be made to ensure that all those involved cannot be identified, including the use of pseudonyms, it may be possible that other people working in your faculty to work out who the participants are from contextual clues in publications arising from the research. The institution will never be named.

The Chairman of the Faculty has given permission for this research to take place and is aware of the demands that it makes on your time. You may worry that participating or refusing to participate will impact on your position in the Faculty; measures will be taken to avoid this. In addition, the data collected from you will not be shared with anyone except my supervisors. When data is shared through publications, it will be anonymised to ensure that individual teacher educators cannot be identified. I will provide a summary of my findings before publication.

Possible benefits

This research will provide you with the opportunity to talk about and reflect on your practice with a fellow professional from outside your institution. This could have a positive impact by providing insights into your professional role and how you carry it out.

What happens to the data?

I will comply with the data protection regulations and principles set out by the *Data Protection Code of Practice* and the *Guidelines for Open University Students on the use of Personal Data for Research Purposes*. Copies of these documents can be supplied to you on request. The key points are that:

- Only data pertinent to the research will be collected
- You have the right to decline to give information
- The data will be anonymised and confidentiality will be assured as far as is possible.
- You will have full access to the data collected from you.
- The data will be kept indefinitely on a secure server at the Open University until such time it is no longer required by the researcher and it will then be destroyed.
- The data will be password protected and will only be able to be accessed by the researcher.
- The raw data will not be shared with any third party except my supervisor.

What happens after the research is complete?

The EdD takes 3.5 years to complete, although there is the possibility of an additional year.

The data collection phase is scheduled for 2016. Once the doctorate is complete in 2017 or 2018, the data collected from you will be destroyed, although anonymised data may be used for subsequent research papers.

What if I have concerns or want to make a complaint?

It is very important to me that I behave professionally and ethically at all times. I will follow the British Educational Research Association's Ethical Guidelines (2004). I also hope that you will be able to raise any concerns with me personally. If you feel that you cannot do this, you will be able to contact my supervisor or a member of the Doctorate in Education team at the university. In the first instance, you should send an email to FELSedd@open.ac.uk.

I am prepared to participate – what do I do next?

Please read through the consent information below. If you decide not to participate, please let me know and I will not contact you again. If you do decide that you would like to contribute, please sign the form below and return it to me, Kris Stutchbury.

Teacher Educator Consent Information

I understand that:

- This research is being carried out for a Doctorate in Education (EdD) and is not funded by an external organisation.
- That the research aims to develop a better understanding of the roles and practice of teacher educators working in an African context and the knowledge that underpins this practice and decision making.
- There is no compulsion for me to participate in this research
- If I do choose to participate, I may withdraw my participation at any stage or occasion with no negative consequences.
- I will receive no financial reward or recompense for taking part.
- Any information I give will be used solely for the purpose of this research, which may include academic publications after completion of the EdD.
- The information that I provide may be shared with the person supervising the EdD research.
- The data will be anonymised before any data is shared in a public arena.
- Confidentiality will be respected by the researcher with regard to the information give, including the use of pseudonyms and other measures in order to preserve anonymity to the greatest possible extent.

Thank you for taking the time to read this information.

Signed.....

Name (please print).....

Date.....

Appendix 3: Interview questions guidance

Understanding the context

1. What are the key features of Government policy on teacher education?
2. How is pre-service teacher education organised in the institution?
3. What is on the curriculum? What is the balance between theory and practice?
4. What is valued in this institution?
5. How do you get promoted and why?
6. What changes have taken place in recent years? How have these changes impacted on teacher educators?
7. How are ST assessed?

What are the conditions that enable and constrain TEs in a Kenyan university in their work with student teachers?

How do these impact on their ability to implement changes in their practice?

- why people behave in particular ways;
- how the context in which they are working affects what they can and cannot achieve;
- how their behaviour impacts on the context in which they are working.

Past histories, including roles and experiences

8. How did you get to be a teacher educator? What is your career path?
9. Was there a 'critical incident' – some point at which you could have made a different decision and had a completely different career path?
10. Of all the roles you have held, which was the most fulfilling and why?
11. How do you prefer to learn? Can you describe particularly memorable learning experience? What made it memorable?
12. Have you taught in secondary schools? How has that experience impacted on your current role? Do you consider this to be important? (*Murray and Male; Dinklemann*)
13. How have you acquired the professional knowledge required for your role as a teacher educator?

Professional knowledge that they hold and value

14. What do you consider to be the main aspects of your professional knowledge?
15. How did you develop that professional knowledge?
16. What makes you different from being a teacher?
17. During your time as a teacher educator, how has your professional knowledge evolved and developed?
18. Think of yourself a few years ago – what do you know now that you did not know then?
19. Have you had any research training? What was the nature of that training?

How they see this complex role

20. Describe the aspects of your role as a teacher educator?
21. Tell me about your teaching. What is your teaching load? Give me an example of a session which you feel went particularly well? Why did it go well?
22. Give me an example of a session which you felt did not go well. Why did it not go well and what would you change?
23. Are you engaged in research?

24. What is the nature of that research?
25. What is your approach to supervising students?
26. Describe to me an 'ideal student'. What would they be doing?
27. How do you support them in being the sort of teacher you want them to become?
28. What resources do you use in your work as a teacher educator?
29. Why have you chosen these resources?
30. Are there more /different resources that you would like access to?

Political, institutional and cultural environment in which they work and their response to that environment

31. Who is your line manager/boss?
32. What is your relationship with them?
33. What changes have taken place in this institution in recent years and how have they impacted on you?
34. Do you feel supported/empowered in your role?
35. If you could change something about your working environment, what would it be and why?
36. How does your working environment in this institution compare with other places in which you have worked?
37. What are the key aspects of the institution development plan and how do they impact on you?
38. What challenges do you face in your role?
39. What do you particularly like/value about working here and why?

Relationships they have within the institution, with their peers, with teachers and with student teachers

40. Tell me about your relationship with your peers. Who is your closest friend and colleague and why?
41. Do you work collaboratively? Do you have an example of a time when you have taken someone else's idea? Do you have an example of a time when a colleague has taken an idea of yours?
42. How are you perceived by teachers in the schools that you visit?
43. How do you work with teachers? What is the biggest challenge you have faced in your work in schools (*TE as broker*)
44. How are you perceived by the student teachers that you work with?
45. What feedback/responses do you get from students?

Sense of agency – the extent to which they are empowered to drive their own professional development, and make their own decisions, alongside how they negotiate the complexities of the role

46. If you were Minister for Education, what would you like to change about the way in which teachers are educated in your country?
47. What would you like to change about school?
48. What professional development have you received? What did you learn? Have you been able to implement this learning in your role? In what way?
49. What is your vision for teaching and learning? How do you enact this vision in your work?
50. Tell me about something you have done in your role that you are particularly proud of? Why did you choose that example?

Appendix 4: An example professional narrative

Teacher Educator P Narrative

Professional History

P enjoyed physics at school, but was under pressure from her two brothers to study medicine. She had a phobia about physics practicals, so started Biology. But she could not cope with dissection, so changed back to physics. Her first physics teacher *Was quite elderly. And one of the things that made us er, you know, like physics is, is because of his erm, he's fatherly. It's not really the way he was teaching, but he was such a father..... you know, to the, to us. So he never used to harass us and that made me like physics so much. But I really feared practicals. I was so scared of practicals, because there are many things that they were telling us. You know, that accuracy, the accuracy is what, because... And one person who, who has no patience, that's my character. I work very fast. So many things at the same time. (P1; B157)* . But Biology was worse, so she went back to physics and met a young teacher from England who was very good because he *'Individualised teaching and he could detect the area of weakness. (p1; B169)* and he was good at relating science to everyday *The area of weakness. So he knew my area of weakness. I was doing practicals, every, every week. He would do the practicals and I repeat and I repeat and I repeat. And er, he was also real. Like if he was teaching something like, things like we call them Doppler effect. You would go to the field and listen. You would come direct, that one I have never forgotten. You'd drive along a very... The Doppler effect is when the vehicle is coming...(P1; B170)* This has influenced her own approach to teaching ... *I'm very care, because I can imagine many of the people who are, have a phobia of practicals and I, and that I have. (P1; B175)* As a result of this teacher, she decided to be a teacher *That's how now I begin. I change my mind, I decided I'm going to be a physics teacher. So that, that, that's how the influence, he influenced me, not only to love the subject, but also to like teaching. So, and erm and he also helped us to do a lot of projects. You know, erm, in those early times of 70s, you see we didn't have FM radios. But I remember he made us sit down with another gentleman and we made an FM radio. (P1; B181)* She feels her training as a teacher has not prepared her for her current role *So when I was being trained to be a teacher, my training was to deal with a small group. (P1; B191)*

When she was working as a teacher, P became involved in the National body with responsibility for the curriculum. *So, I also fitted very well, because I, before even I joined university, when I was a high school teacher, I was, somebody noted me where ever it is and they invited me to their Curriculum Development Centre (P1, B395).* One of the lecturers from This university has recommended her for this role.

P talked about modelling active learning and the workshops she runs in the university. I asked her where she learnt to do this *So, I was, I, I learnt to manage, the way we manage workshops, you*

remember the way we manage TESSA workshops? (P1;B291). She also learnt from her own Form 6 teacher and from her PhD. In her PhD she used the ECCC approach (Experiential, Co-operative, Core, Concept Mapping approach) So er, that's what I wanted to use. And then there was some schools that were... I trained the teachers to use the method.....And then other schools, they were just teaching the same way, the way they were teaching. And we realised that they'd, they'd had a real, a real impact.(P1; B327) She has also had international opportunities through her QA work. Hmm. So that is now what I used for my PhD, what I learn from TESSA, of manage, through the management of our workshops. And we have, we have also another one, another project with quality assurance. I also, when I rejoined the quality assurance that's when I went to Germany. The way they managed their practic... their workshops is the same way. (P1; B339). Working with Joan also helped And in fact I was just now telling myself: you know you, you no longer have to just sit there and to tell people what to do. You need to give, you are given time, you need to ask the people to do that. And then, also Joan [this sounds like John]. Joan really helped us. She, she showed me...She also helped me with, you know, we sat with her and she, I was listening and making notes (P1; B351).

I asked P what she is most proud of in her professional life: *The physics teachers I produce, they do very well and they also continue for masters.....I have been an influence to help them to go, many of them go for masters.After they now do their school bits. They get jobs. You cannot get a physics teacher alone. And then I'm also able to influence their character. Yeah, that one I am very proud of. They come when they are very hostile, they don't dress well, so they don't keep time, they come late to class, they come when they want. But after some time, you find that with attending when we are through with them, they change their way of dressing, they also appreciate coming early and keeping time. That's something we don't tell you. If it is 7 o'clock, I'm there 7 o'clock. And they, we agree, so we agree this is. And then we, we, we, we write their programme with them. When I come to their lecture the first time, I tell them: this is the way we are going to have it. I'll give you the cut-off this day. You do this on that day. This day I'll not be in. It's going to be Easter. So the programme is known to them. And this now makes them, you know, that makes them even like... This last year's group, the one I was teaching for microteaching, that is the Tobias group, they were having a final, a final party, because now they are in third year. So they are inviting me to go and see. And they are telling: come and tell us more about how we can grow in physics. So meaning there is some invitations. So that's, that's one of the things I like about teaching. And I feel tied up. (P3; 377)*

Approach to teaching

I asked P about the difference between being a teacher and a teacher educator. *Oh yeah, I would be a very good teacher. [Laughs]Actually I'd be a very good teacher, because even when I*

came for masters, I did my research after masters, I was able to change so much, because I was able to apply what... (P2;B3) She tries to support all her students through individualised support So I think I can... And one of the things is individualising learning. Individualised learning is what can help our, our, our, our students in secondary school and er... (P2;B33)

She did not really answer but said her own approach to teaching Yes and also erm, I, I, I tell them to take, the word I use is: take the subject home, outside. Don't, don't, like even when I go for TP, I tell them: can you take this subject outside? If you're teaching biology and you're teaching them lessons on blood, whatever, Rhesus A or positive or what have you. Don't just tell them about Rhesus positive, take them to a hospital in their minds. Just make them visit the hospital and then imagine they are going there and they are now being, they are donating blood to a sick person. Let them see it. We are not in books, because we just copy their books. So even that, that's what I insist of them. I wanted to take this subject outside. (P2; B41) I asked her about the different part of her role as a teacher educator Yeah. So not just teaching them of course. That is it and they, you know, making it, making it very real and then the other focus I want us to remove is focussing on assessment. You know, assessment always has been the learner. (P2; B57) and You're not doing well. But the assessment now should come to us. I should look at myself, that if these students are not passing, then I have failed. So there is an area that I have failed. So I need to do the correction. So when I mark like now I have given them the card. I will give them the feedback. There are 134. So between now and Tuesday, Monday, I mark all of them individually and then I look at the weak areas. Then they'll actually know that there is, they could, if, if a certain area is there, they're not doing well. I'm the one to bring. And if there is a specific student who has done poorly, then there must be something that I need to address. Er, so that is about assessment. So we need to do continuous evaluation of ourselves. (P2. B61) When she is teaching students, she tries to remember what she was like at their age The kind of a person I was, I can see them. I can see myself in them. That helps me now to handle them, you know to handle them with care by looking at myself at their age.So even when I'm very harsh, I can see myself with all the childishness and what have you. And I keep on reminding them that the difference between the age of the students they are going to teach and them is very thin. They can't... The students don't see them as old people. If I go to class I command respect, but for them, they can't command respect. (P2; B77).

She thinks it is very important that students learn teamwork Like when I give them assignments and the, some person does not belong to group, I just don't give them marks.....I have noted that in this class I have two students who cannot be in a group..... They don't want to work within a group. So they must be having a problem, which I, I want to, to refer them to the counselling, so that that can be addressed. (P2. B99)

In 2015, I observed a lesson with P. The student dictated (too fast) from a textbook they had in front of them and used a poster on which the writing was too small (and was a copy of the diagram in the textbook). Her response was that it was '*our fault*'. By this she meant that he had followed the course at This university for three years and this was what he did. (FN 2015, p57).

Pedagogical content knowledge

I ask P where students will learn specific things like how to teach forces? *No, no, no. They learn within the, the, the... They learn within the, the subject method. (P1; B42)* She shares with me an exam paper that she had set *Yes. We normally take specific... Like if we look at the exam I've given you here [papers rustling].....If you look at the exam here [papers rustling], you will [13:52 drowned out by sound from papers] teach methods of chemistry you cannot answer these questions. (P1; B46)* Now this one, now, we have chosen the topic on magnetism. *So if you are a chemist, you cannot be able to answer the question, because I want them to, to follow these objectives and prepare at both specification.(P1; B49)*

I asked 'How do student teachers learn to teach practical work?' *It is instruction. Us, we teach instruction and curriculum. Those are the things we teach. But we have what we call servicing departments.....The servicing departments are the ones that teach the subject matter. (P1; B124)* But this is problematic *And er, they also have some, quite a big unit, in fact like now they have gone because of the issues of physics practical. The way they have been presenting the practicals has not been acceptable, so they are going, they want to change the format. So they are going for briefing, to be told how now to change the format for the practicals. That's what they told me. (P1; B130)*

Even their lectures, they are mixed. Yeah, they are mixed [people studying physics and people studying teaching]. We don't have cases where we have... And I think that, that brings me to an idea, a big challenge, because when they are mixed, they just see physics as physics. They don't see that they are learning that physics. In fact some of them are asking me: why do we have to do all this physics? And what you are going to teach is below us? You know they can't really relate. I think that's a big challenge. (P1;B134). I asked her how this could be tackled and she started making notes as if it was something that she had thought of in the interview. *That's, that's, I'm just now starting making this note, that one down. [Laughs] I need to write it down, because I think somebody needs to do some, some, some kind of er, research and find out, because this is er, physics practicals and er, physics practicals and the teaching of, teaching of physics. (P1; B137)* One way to tackle this would be *Physics practicals, physics practicals in secondary school. I think one way of doing it is handling the students separately. (P1; B138)* But this would be problematic at the university level *Hmm, yeah. And anything that touches on finances, becomes a real challenge. (P1; B145)*

Micro-teaching

Micro-teaching is an opportunity to simulate a classroom So what they're supposed to do is, when they come to the microteaching groups, they are supposed to teach now the rest of the class. So these other students behave like students, Form 1s, Form 2, because that's where they teach. So while the students... The student teacher teaches, the others are now listening and er, before they, you teach them you are supposed to take them through: what is microteaching; how the microteaching programme is supposed to do; what are some of the skills we look at. So some of the skills we look at is like what we call set induction, especially during introduction. (P1; B7) The hope is that they will involve learners, but And then we don't allow a lot of lecturing, although they do a lot of that.....Because we normally tell them to use other methods, but use lecturing. So they copy what we do. They're supposed to use illustration, you know. We also look at how they reinforce animation of stimulus. And then we also look at how they take the other students through until they come to the conclusion. And we want to see exactly whether the objectives were achieved. Now, before they start the microteaching, we ask them to make a scheme, a scheme of work. (P1; B9). P went on to explain what she looks for in micro-teaching: And er, the condition is that when they now come, they give me the scheme of work, my copy and they're left with their copy. And then they now come in to teach. So when they are teaching they give me their lesson plan and a copy of their lesson plan and they're left with one. So now my work is to follow what is, what the person, the student has planned. Is that student following the lesson plan? You know, that is one, we actually look at whether they are following the... [paper rustling]. In fact we go through stages. We look at how they have prepared the lesson plan. (P1; B12)

And we, in relation to the scheme of work. Then we now look at how they now present, the presentation of the lesson. How do they do the introduction? You know is it relevant? Some of them just take one look and went and did some irrelevant things. How do they take the development, their steps? Do they follow the steps clearly in their lesson plan? What is their style? Is their style of teaching appropriate for the learners? And then are they involving the learners? Are the learners motivated? How are they using the questioning technique? And then you look at how now they come to the conclusion. Are they able to keep time? If it is ten minutes are they able? If it is forty minutes, are able? But you normally insist on ten minutes. Some of them will go beyond. But you normally have a bell ringer in the class. (P1; B13)

Then you look at the content. Do they know the subject matter? So that now, some of them will teach and they don't have the content. But you rarely find they don't, the content teaching is not a problem. But the problem now with the content is the depth.(P1; B14) They might go beyond the depth of the learner. So they lose the learners on the way. Then resources, this is now where we want to know how are they creative? This is where we insist now whether they can go for open

education resources. Are they creative, are they, is it environmental friendly? Is it clear? Some of them may put a chart that is not very clear. When do they use it? Is it at the last, you know? Sometimes they keep the chart until the end. (P1; B15)

So you want to see the time limits on how they use it. And then we also look at the use of the chalk board. Because most of the classes I use chalk board. So how are they using it? So you'll see some of those clear when we get class. And then the personality. Now when they are students at the university they dress carelessly. So you look at them, the way they are dressing, how they are projecting their voices. Some of them are so shy, they don't want to look up. But after some training, they are able to now face their students. The eye contact, that has been an issue with some. Some of them, I have two now. Last week we, I had to train them on how to maintain the eye contact.(P1; B16)

Because and then when they are writing the board, they write facing the board. So that's some of the challenges they face. And are they decent in their language? And also in the way they dress. Then how do they manage the class? This little class that they have. You know, the others are told to behave like young children. So some of them will then become cheeky and how do they handle that? And then after that we look at whether they like mathematics, whether they've given an assignment and so forth. And then after now, like they taught on Friday. So to, I told them to make a record of work. So I'm going to mark the record of work on what they taught. Because I also want to teach them on how to make the record of work. So that is normally what we do if we're doing the microteaching. And they are supposed to teach in every subject twice. But sometimes, because of time, they are not able to finish. (P1; B17) I told them to use their... I told them to make science relevant and real. Also mathematics, relevant and real. (P1; B19)

Micro-teaching is not graded which can be a problem Which now makes it very difficult for us, because the students are supposed to, you know, we don't attach any mark to them.....So sometime they are not serious. Some lecturers now are not serious, because when somebody's not insisting you give them marks, at the end of the day, so you can never even escape. So we are trying to harmonise. This is what, [papers rustling] this is the kind of er, scales...(P1; B22)

To try to harmonise. You know we are all different and we have our own idea, about seventy of us or eighty of us. And some of them are teaching maths, others are teaching sciences. So we have all that.(P1; B29)

When teaching large groups she divided them into groups Yeah, really big classes. I don't think I would still teach them, the lecture, the lecture way. So I'm able to, to get closer to them, because of the, the group work. (P1; B235) So, and then I usually give them feedback. So when I'm giving feedback I sometimes would like to call the group leader and this, I notice that. (P1; B239)

P thinks it is important that students try and evaluate themselves. In the micro-teaching she asked them to comment on each other's teaching and to evaluate their own. *So when I was briefing them before, I told them: every time you go through a lesson you must evaluate yourself. (P3; B269) Yourself. You sit down and ask yourself: if I was told to repeat this lesson again, how would I teach it? But this kind of telling them to comment, that one I didn't..(P3; B273) I didn't prepare them that they would, I just tell them to comment. But you see this time, the first time they were a bit shy. But you see us now, we were getting on, they were becoming more bold. (P3; B277)* She tries to model reflective behaviour: *And then in the beginning of the lectures I told them that I'm their lecturer, but I'm also learning. So that's why I'd like them giving me the answers and helping me to see what I can't see alone, yeah (P3; B293)* This was emphasised when I asked her which aspect of her practice would she like to develop. *So this, the way I see them, they're my children. So we are at a very different age group. So now their world view may totally be different from my world view. And er, there are things that I would really like to get from them that now helps me to be able to give them the proper training for the world. (P3; B305) Because the way, the people they are going to meet in the world are a totally different generation. So if I, I still go with my own traditional way of doing things, the way I've always seen things, I may not help. But if I am able to embrace anything that is coming new, that would help me to change. And now I am also pragmatic if anything does not work, then you don't need it.....So I need to embrace, so in, in, especially in pedagogy. We are really changing. Like now new policies and laws have come. Previously like in Africa used to cane students. Now we have a new law about the child rights, so erm, then er previously like the way we used to, we were handled in schools ourselves by teachers. They were very hard on us. You know: you must do something. If you don't do it you are punished. You make them kneel down. The children we have now are so delicate. You tell them to kneel down, the parents will take you to court. So you need to get and then get there. That's what I'm, I think that's the thing I would really like to learn. If you really want to help somebody you must understand what is it that is, is, is about them, is about their generation. And of course as we are seeing these our children they totally think differently, they really want to have things so different. So you cannot hand out, if you are going to handle them the way we want, you will not get them. You will lose them. I don't want to lose them. (P3; B315)* She is also continuously revising her approach: *So I change the PowerPoints, now to, and I have to keep on. If you look at my notes this year they are not good, because I keep on changing every night. So if this idea, I was not able to get time to request a room where I could be able to project it. And even if I, I have my own projector, I can't project because there's no socket. (P3; B345)*

Departmental briefing on micro-teaching

- The briefing document sets micro-teaching in the context of having been designed by Stanford University. 'Micro-teaching aims at ensuring that competence is acquired in one skill before proceeding to the next' (p1)
- 'The micro-lesson in which only a single skill will be practised will take about 5-7 minutes'
- 'The skills to be tested will be'
 - Lesson introduction
 - Lecturing
 - Illustrating and use of examples
 - Questioning technique
 - Stimulus variation
 - Reinforcement
 - Closure, conclusion or recapping
 - Demonstration
 - Integrated presentation
- The document sets out what is meant by each skill. Points to note:
 - Lesson introduction suggests posing an intriguing problem for students to solve
 - lecturing is broken into formal and informal. Informal is the type recommended for secondary schools (interruptions and questions are encouraged).
 - Illustrating should involve drawing on examples from everyday life
 - Questioning – describes probing, higher order and divergent questions
 - Stimulus variation is about 'attracting and holding attention' through varying presentation (oral and visual), moving around the classroom, using hand and body gestures, varying pitch and tone of voice'.
 - Reinforcement – described in terms of providing incentives/rewards to pupils for desirable behaviour
 - Closure – 'passes the message of the lesson'
- The document sets out expectations for teachers' classroom behaviour, highlighting the behaviours which prevent learning. These include: placing too many controls on students, too much emphasis on testing. Focusing on power and authority rather than on learning, repressing one's emotions and not appearing to care.
- The document then includes a section on what students will find in schools 'Performance is poor and lacklustre as most Heads are incompetent'. (p4). The list of reasons for this blames heads and admin staff, teachers, governors, parents, MoE supervisors, badly behaved students, organisational structures and lack of accountability.
- The document then has copies of the templates for the Department's scheme of work and includes an appraisal guide (but no indication of the expectations around its use).
- The appraisal guide specifically states that 'lessons must always be learner-centred'.

Notes on the observation of micro-teaching

The micro-teaching took place in a basement room. The room smelt of urine and there was some loud hammering going on near-by. (Field notes p28). P's manner is just like a teacher in a school. They laugh about the exam that they had done earlier in the day.

Student 1 – when asking questions he gathered more than one response. A student asked a question and he threw it back to the class. P suggested that the students might think he does not know the answer. (p29) Uses a resource – piece of paper which he asks students to scrunch into a ball

Student 2 – uses an avocado stone to represent a ball. Unfortunately it breaks when he kicks it. P commented on the fact he should have divided the board into sections and encouraged him to leave a bigger gap between questions (longer response times) to ‘show the learner you are listening’. P encourages him to use more everyday examples.

Student 3 – uses a box attached to a piece of string to demonstrate forces. P comments on the lack of demand of the lesson, and on the fact he did not follow the lesson plan. The other students suggest he should have thrown the questions back to the class.

Student 4 – uses the door to demonstrate forces – push and pull. Gets several answers to his questions. P asks the class for comments. They comment on unclear pronunciation. P reinforced their points, demonstrating inclusive behaviour (p32) but criticised him for not sticking to the plan.

Student 5 – uses a beaker of water to demonstrate pressure. P commented on the fact that he stuck to his plan and the work on the board was very neat. He was criticised for too much repeating of ‘are we together?’

Student 6 – get some of the class out to the front to demonstrate measuring speed. The student struggled to make eye contact. P urged to class to help him (p33a) ‘as a team we can help him’. P was also concerned about his subject knowledge and used the school syllabus that she had with her to check the content of his lesson.

Student 7 – does a demo with some hot water and cold water to demonstrate conduction. In the discussion afterwards one student comments on the lack of questions. P suggests that sometimes you can delay asking questions until you have finished ‘the object is the learner not the learners’ (p34). No reference was made to the lack of any link to everyday science.

Student 8 – does a demo with a plastic ruler and pieces of paper. Object to explain attraction and repulsion. The student dictates notes from the book but when someone says ‘I don’t understand’ he just reads it again slower without an explanation. P commented on this and suggested he could have made more reference to other part of the syllabus eg friction.

Student 9 – student was supposed to be explaining fractions – focussed on defns of improper, proper and mixed. Very weak. Only comments were on the use of the board – there was a lot that could have been said – particularly about relating fractions to everyday – but all the comments focused on the use of the board. (p35)

Student 10 – used pieces of paper which students had to tear into ever decreasing sized pieces to demonstrate that everything is made of particles. She repeated it by grinding up some chalk. The comments from P and the students were all very positive. There was no discussion about different ways to teach particles or critique of the model used.

During the micro-teaching, P did not comment on the lack of cognitive demand in many of the presentations, classroom management issues around some of the activities (kicking a ball, cutting paper into many pieces), lack of relation to everyday life (despite asking them to prioritise this) – FN p38a)

Discussion about micro-teaching

I asked P how she felt the micro-teaching went. Er, okay. *They, they, first of all the preparation.....You know previously they were not using the lesson plan.....So they, they were preparing. The preparation was okay. Then they had improved on the chalkboard use. (P3, B21)*

..... There was a lot of improvement. Previously it was very poor. Then I feel there was an improvement on management of time for quite a number of them. They were managing the time. Previously these were preparing, could have five, four objectives, only ten minutes. (P3; B25) Actually it was only a few who had not improved. And er, then they, the other thing is the pedagogy, the methodology, which previously was more of a lecture.(P3; B29)

In the micro-teaching, P had asked them to concentrate on making science relevant and real: But I could see now there was a bit of learning movement. That's, that's, that's the way I can see. But there was a problem in the use of the materials. The area that I told them making science real and relevant. It's like the concept did not get in them the way I really wanted, you know. (P3, B33) They were not really going for locally available resources. And they were not making it so real. Okay, they thought that by bringing real objects, that would make it real. That, I think that concept, they did not get it, which I also told them about. Erm, then we did an evaluation, at, after you left. I told them now to evaluate who was the best...(p3, B37) She asked the students to judge who was the best. Yeah, they said Phyllis. Then I challenged them and I said that I think that's not the way it should go. Because they felt that others are better than them. So what, the concept I wanted to bring to them is that the best teacher is myself. You should be able to see yourself as the best teacher. So every time you're now preparing, you're the best teacher. So if you are looking at somebody else as the best teacher, you'll never prepare yourself, because you always feel inferior. But that was their, their feeling. Then the other thing they evaluated is they are very happy about the support, the support I've given them throughout, from the time I've been teaching them. (P3, B53) I asked how she supports her students: So, since they started I've been moving with them, teaching them and they, especially they didn't like the assignments at the beginning, because I was giving them weekly, group work assignment. But they have said that those group work have really helped them, have really built them. Then the other thing is, but they were, they were saying that erm, they are saying that I'm, I'm, I'm reachable. (P3, B73) They're able to access me because the other lecturers are out of reach. When you come, you lecture and you go. So many times we interact with them and they are able to come at a personal level.(P3; B77)..... So that's the way. The other, the other, the other way the support is, I was also giving them the materials. I would go and photocopy the hard copies and come and give them. Anytime I feel something is very important I'd come with a copy and I'd tell them. Like there is this paper we presented in, in South, in Mauritius...(p3, B81)..... ... about constructivism. There was a section of constructivism. So I told them to go and read a section of that paper. It would help them on the principles and tenet, tenet, tenet principles of constructivism. So I gave that, them that. So those materials were helping them. Any section, anything that I feel is good, er, I would give them. So they felt that that was good.(P3, B85)

I asked if she specifically noticed her students doing things that she had emphasised. Questioning was one of the things I noticed – they asked a question and then asked someone else for the answer, usually giving more than one person the chance to answer> But when I asked P, the answer did not really make sense: *The only problem is that I was not able to, to project, because of the, the kind of room we were using. So I want, I really wanted them to see some of the test cases. So I just give them the case, that I went to class, the students are behaving like this and this. I would also use some of their behaviour in class. You know the way they were behaving in class. I would tell them: this is exactly what should happen. So it was real cases. And then in class we have been having time for questions. So I've been asking them to ask me questions. And I behave like: now I am a secondary school teacher, they are my students. So you'd have that kind of interaction, yeah. (P3, B93)* The test paper that she set them involved making a specification table. This highlights what type of questions should be asked on each topic. The students were asked to produce two structured questions as examples, but not to relate these to the various question types specified. Two interesting notes: P was amused and delighted that I did not know what a table of specification was and when I asked her for an example of a question that they might ask to test higher order thinking on magnetism, she struggled and the example she gave was not relevant. (Field notes p72)

Another thing she has really emphasised is making science real, but also asking students to describe what they see rather than telling them what an object is. *Yeah. They're really, they're, they're making the subject real. If like what I was, remember I was telling them about perceptions. The way a student perceive things. I, I discourage them from telling their students: this is a mobile phone. Because there are so many things the student perceive. You may be talking of mobile, but here, so the students will see the colour. So you want to get from the students what, what, what it is that you are holding. So the apparatus, I discourage them from being the ones who are telling the students what the apparatus are. Let the student come up. Like you see now he was, a student was telling me that he was having a ball. (P3, B105) Then on the way it just broke and it was messed up. So I tell them to be real. You know, if it is... Get, get the perception of the student. Help the students perceive what it is that they're, they're thinking about. And I gave them quite a number of... I should have given you... I don't have my, my, my notes with me. Or I'd have given you some of the, the, the levels of perception, various things that students perceive differently from what you're thinking. So that's something I insist on. Then the other one I also insist on is that when, whenever they are dealing with students, they need to command respect. So they should not give outrageous, you know, things like, just like a joke. You know it's good to joke, but they have to limit their jokes. So those are some of the things that I am telling them. (P3; B113)*

She referred back to the 'ball' incident later on. The student wanted to do a demonstration with a ball, but had used an avocado stone instead. P was very annoyed at that.

That one is a bit disappointing. That, I don't like er, that kind of thing. I didn't like people being real and not lying to students. You know, it's an outrageous lie, so I was a bit disappointed with that. Erm, then of course I'm also getting disappointed with this learner who keeps on saying: eh, eh. And I've tried to help him. It's like he's not putting a lot of effort to change that. I didn't like that. I was, again on him, and I told him to redo, to do it again so that he can change. Otherwise I, they're the best class, that's one of the best classes that I had. (P3; B193)

Working environment

P teaches very large groups *B.Ed. Arts, that is Science, there are about three hundred and something. B.Ed. Arts, they, I taught them, there were 586. (P1; B4).* They cope with this by dividing them into groups of 15 for TP and micro-teaching. *That's B.Ed. Arts. So when you are teaching them, you cannot be able to help them now. So we divide them now into smaller groups. Like now we have divided them into groups of fifteen. (P1; B5)*

The Education department are seen as experts in pedagogy. P has been asked to help other departments adopt more active learning *We train them how to use active learning. So we can do that. So I've been trying to do that. I was, the other time we had a workshop with doctors. I trained, I was training them. We had the project where they were training people, management of which I lead. So I made the curriculum and I taught them how to use active learning in there. (P1; B267).* She has also had opportunity to run workshops on TESSA for colleagues *When I was talking about active learning... By the way I used those notes that you gave me, I made the PowerPoints. You remember the ones you sent me in with the PowerPoints. (P1; B251)*

I asked about how members of the department work together. How was she inducted into her role as a Physics lecturer? *A difficult one. It's not like you sit here, I show you. [Laughs]It's just telling you: this is the course outline... and now, I'll teach up to here. (P1; B427)* *It wasn't mentoring, because..... he didn't allow me to, I didn't even have time to attend his, his classes to see how they do the teaching.... ... he didn't allow me to, I didn't even have time to attend his, his classes to see how they do the teaching. (P1; B451)* All the people who helped her at first were older than her *By the time I came in I was doing my PhD, so I was under them. So it was a bit, you felt a bit intimidated, you know. (P1; B515)* But when she is working with younger people she can influence them *This 600, this 586 we taught with Anne. So I, I, I, when she start, she's only started*

teaching. So I told her: don't bother yourself, bogging yourself down with the lectures and whatever. Divide them into groups. (P1; B535)

Yeah, so we've shared with Anne. So I shared with her what she's going to, to do. And she did it. Actually I came over and took over the groups, as they were. (P1; B543)

She works closely with younger colleagues, including a PhD student of hers So at least I was able to sit with him and explain, but I never attended his lectures to see how he is doing it.....Yeah. It's easier to handle the younger ones, because these ones are older, they tell you: I taught you, now how can you come to teach me? [Laughs] (P1; B563) They are a bit difficult to, to handle really.(P1; B571)

They have departmental meetings at the beginning and end of every term. What is discussed? Of course like the key thing is division of labour.....Yeah, we divide, division of labour, that is our key thing. Of course there is always a lot of things or communication from the chair. (P2; B125) Then another thing that is now coming up is the issues of performance contract. We are now doing performance contracting. (P2; B133) Like now we have to share, we're having holiday, school based, yes. Teachers who are coming in service. So we are teaching them. Then we have the marking of exams, they are going to do now and submission of marks. There is also issues of teaching practice. So and, those are the key things. Most of it is the division of labour. We share out, what you share. And of course in the end the things that come up. You know every is, every meeting has its...(P2, B141)

In her own teaching, P is frustrated by the lack of time Even whatever, arts. So I wish I had more time, because of these ones have not been able to handle them well. But they are very good, even in, even in their lectures. (P3; B253)

She is also frustrated by a lack of equipment Yeah, so that is it. Er, that's one of the things. The other, the other, last year I was given a room where I could be able to project.....Now this one I was given a room where I cannot be able to project. And there, that, the previous year there were a hundred. This one's 150. So you cannot have... (P3; B333)

One of the things that P talked about at length was research (P3 B405 – end). She really enjoys teaching – and enjoyed teaching in school. But she felt she had stagnated and was not developing. Studying a Masters and a PhD opened her mind to other possible approaches and new knowledge. In her current role (Deputy Director of QA) she does a lot of research type activity – questionnaires etc – and has to write reports for the university. She is frustrated because she would like more time to write up the work she is doing for publication in academic journals.

School science

I asked P what she would change in the school curriculum when it is revised. *Form 1 work is so much, is voluminous. And er, in our system of education the KCPE, they start the 8. They do the exams in November, but the results come out at the end of December. So the whole of January, there is analysis, there is work, so the students report a month after the schools open. So this voluminous work, and the students report, they hardly ever finish the Form 1 work. So now this spills over Form 2. So that one is a bit critical. Then there is a...*(P1;B92) There are also topics in Form 2 which should be in Form 4. In summary, she would like to see

- Content revised and reduced (P1; B92-94)
- Learning objectives replaced by learning outcomes *Because learning outcomes is about what the learner can be able to do. And that now directs our implementation process to be more of experiential or, can say activity based, you know.* (P1; B95)
- The restoration of project work in Form 4 (P1; B96)
- More on transistors and topics relevant for children leaving in Form 4 to go to technical colleges (P1; B97)
- Some guidance for teachers on how to teach as well as what to teach (P1; B98)
- The syllabus should be modernised and have a lot more the everyday relevance of the subject matter. (P1; B101-108)

P sees 'Physics literacy' as very important ... *literacy. Then there is now the processing skills, which we have er, some of the processing skills are measuring, there, some of them are measuring, there is calculating, there is experimenting, you know there is now the analysis. Those ones are high order, yeah, quite high. The analysis and then doing some evaluation of some of those practicals. So these skills cannot be taught by just speaking or lecturing. They need to do it, so that they can actually know that when I, when I swing this pendulum and then they are able to do the experiment, then they're able to count, then they're able to divide. And then they are now able to apply and they know that that pendulum is telling us there's a force. So they're able to relate that to, you know. Erm, I was asking some people that: why didn't God allow us to have watermelons...* (P1; B116)

Then finally the, the, the other thing about the practicals is that we need to make physics real.....Real. So you don't tell them that there, there, there is something called [?? 33:29 sounds like acorn or a cone] and therefore you just tell them how to do it, but it can't stop. You know you want them to go down and do it themselves. Let it drop and then they see it is dropping or you know, electrostatics. So that when they get into a vehicle, and their dress sticks to them, then they know that this is nothing strange, it is about electrostatics and so forth. So that's what I'm now

talking about, making it real in our life and therefore we appreciate, this now helps us to appreciate the environment. Er, it helps us to appreciate that you don't have to walk close to the road, because there is that Bernoulli's effect. When you see an aeroplane going up, you know it is all good physics. And that now, after now this making it real, it helps them to build careers, you know their careers. It helps them to build careers. So...(P1; B120)

I asked P how she interacts with the teachers in the schools where her students do teaching practice: *We do, but I think the biggest idea you have in Kenya is this idea of when you bring the student for teaching practice the others step off. Instead of seeing these ones as people who need help, they are, it is like they now have free time. You will go to schools and principals do the same. No, no, no, you can't, I can't take in more than two. Because if I take more than two our teachers will be doing nothing. (P2, B193)..... So they leave all the work with our student teachers. So the, the, they don't really do a lot of er, many of them, not all of them, many of them do not give much assistance. Er, they just leave them to themselves, you know.(P2; B197)*

In some of the bigger schools at bit more help is available: *So if you go to the school, you just go to the Department of English. So now there you can be able to ask question, you can see the head of department, you can see other subject teachers. So some schools are quite okay, especially those ones that are established. So you just goes in department, then you can meet those ones yourselves in department.(P2; B217) But they are also very willing to support us. (P2; B221)*

The student teachers are not given conflicting advice by teachers, but they are under pressure to cover the syllabus: *Hmm, yeah. Erm, now when it comes to them giving them different instructions, erm, I must say I've not seen that case. Erm, where you go and there were student teachers, yes I was told by this one like this. The only challenge is that they push them. They push our, our, our student teachers, because they want to clear the syllabus. So they are told that this is what I want you to cover. (P2; B225) This can be problematic for students Yeah, yeah they put pressure on our students. That could be the only major, you know feelings. Sometimes you feel like: no, no, no. You know you don't want them to move as fast as possible, but this was now insist. So when you insist that they, they, they are doing too much in one lesson, then you say: no, no, no, no. That is what I was, I was told I must cover this. So that could be...(P2; B233)*

A significant issue for school teachers is that TESSA is seen as another initiative (like SMASSE) – something extra that has to be added on rather than a resource to make life easier

Questionnaire

Teachers know that learners at any level develop their own novel systems of knowing. Learners do this by constructing and reconstructing existing knowledge that is passed on to them

Teachers are continually involved in making innumerable, practical, small everyday decisions that are of great importance for their learners. For these decisions, there are few or no clear rules of

thumb that can be clearly listed in a manual, or applied systematically from one context to the next.

A good teacher education programme incorporates: the teacher's purpose; the teacher as a person; the real world context in which the teachers work; and the culture of teaching in that context.

Professional development is best achieved when teachers work collaboratively with their colleagues.

In teacher education, attention to pedagogy is critical and should pervade all aspects of teacher preparation courses, especially in the context of subject knowledge.

11/12 on LCE

A year on

A year on a few changes have taken place.

- There is a new Dean and Chairman. The Chairman is Joseph (worked with Jane in 2012) and the Dean is from the Agriculture part of the Faculty.
- The Commission of University Education is insisting on a common format for all course outlines. Many Depts are involved in upgrading courses but The Education Department is not making changes to content, only to presentation.
- The school-based course for practising teachers has changed, It was decided that there are insufficient contact hours. Also the pattern of the school year has changed with shorter holidays in April and August and longer in Dec. There will be more contact hours in the future, making the course longer – this has impacted on the number of people signing up and there are fewer students as a result of this change.
- The school curriculum is changing, but this has not impacted on the university yet. The Teaching commission may ask for more on pedagogy and ICT and less on subject content. They are also putting pressure on the university to make teaching materials available in soft copy.
- The university is trying to address resource issues – they are gradually giving people computers and have committed to provide projectors, but have not done so yet. The most significant improvement that has happened is that wifi has improved.
- The library has improved considerably and people now have access off campus.
- There is a commitment to reduce the issue of class size but there remains a shortage of lecturers.
- P has been tasked with developing a workload policy. They have specified the number of hours that lecturers should be teaching, and any more than that will be paid as overtime. Duties still include teaching, research and admin. Promotion depends on doing research.

- There is a commitment to improve the quality of teaching in the department. This is through bi-annual student evaluations and encouragement to be reflective and assess themselves.
- There is a commitment to tackle student attendance, which is poor, though more student advising. There is talk of a biometric sign-in.
- There is an increasing difference between old established lecturers who are reluctant to change and the younger, IT savvy lecturers. *Yeah, okay, it's, it's, it's possible. But I have two categories of lecturers. We have those who are now the old professors, who think that... They, they are very resistant to change.....But there is this now upcoming team, who are IT compliant. I think that one, I will be able to, to gather them. I could do a count, 1,2,3, about six of them... (PDETA; B249)*
- The Commission for University Education is insisting that lecturers move to more LC methods and there is renewed pressure from the University to revive the Pedagogy Course which has not run for 4 years. *It is not, why, why I think it would be a challenge, but they have no choice. I forgot to tell you that now the Commission for University Education is insisting that we should now move out to, from this, er learn, er, teacher centred methods.....Active learning. In fact we are talking about going to active learning.....Yeah. It is the one that is insisting now we should now go to active learning. So it could be a challenge, but we have no choice. We have to move..... (PDETA; B279)* It is difficult for people to change because *Because most of them don't, they're not, they're not, they have a phobia. I don't know whether it's a phobia for ICT or something, because even when they're filling in maths online, they still have issues. They still have issues. (PDETA; B287)*

P feels that a significant reason for the reluctance to change is the response from students. They are often reluctant to take part in tasks *I don't know. I did it, I collected, I was having a class of about 120 students and I told them we have to use the pair-share. I should have really shown you some of the photographs that we were sharing in the class.....I would give them some assignment and they would do it in class. In one, that one hour I would just present and then they would do and come and present in an hour. At first it was such a battle. (PDETA; B297)*

But if you persevere, it becomes easier *But if you're persistent, they, they, later on they were telling me that that's, that's very good. We need to continue. That, but towards the end of the... And I also realised that takes lesser time and less energy for the lecturer... (PDETA; B320).... And the other thing is that the class becomes very exciting.....Because everybody is participating.....In 120, there are in the front, you'll only have a few listening to you. So I*

would insist, you know, that will make the class very exciting. And then what also surprised me is that those students have a world of ideas.....You, I was also learning, and learning new things from them. (PDETA B344) She did not have an explanation for the reluctance to change. She referred to their attitude to students and ICT phobia.

Yes that is their, the attitude they have, as empty vessels. And er, we also made a lot of use of the mobile phones, which they had. When we were looking, because there's a section where we look at resources.(PDETA; B360) She did suggest that *Erm, one of the, one of the things that we need to do is we need to talk more about active learning. (PDETA; B388)*

The challenge presented by learners finding active approaches challenging was mentioned also in school (FN 2015, p71a, Njoro boys). They see the teacher as the font of all knowledge and want to be told rather than have to think.

I asked how this might happen. At first she talked about working through the Chair of the meeting and formal structures, but then she went on to talk about indirect methods available to her in her role at Director of QA. The one she specifically mentioned is the exit meetings that she has with external examiners. *Yeah. And this, this now, it is also helpful from my office, because you are more on quality of education. So when we have, like we have exit meeting with external examiners.....It would give me an opportunity to talk to them from quality assurance point of view. (PDETA; B403)* She also mentioned the possibility of getting teachers in form school to talk about teaching careers and the routine meetings for supervisors that are held before students set out on teaching practice.

Appendix 5: Analysis of how teaching is assessed

Analysis of ways of assessing teaching and learning

What do these documents tell me about how good effective teaching and learning is conceptualised in this Department of Education?

Teachings is conceptualised as a logical process underpinned by a set of rules. The focus of all the documents is largely on what the teacher does. Most of the points could be assessed by watching the teacher.

To what extent do they support a learner-centred approach?

Documents analysed

- Teacher trainee appraisal guide (micro-teaching memo)
- Teaching practice lesson assessment report (filled in by TP supervisors)
- Teaching practice assessment evaluation questionnaire (from QA department to monitor TP)
- Teaching Effectiveness evaluation form (for students to fill in about their lecturers)

Analysis framework

Based on Schweisfurth's minimum standards (Schweisfurth, 2015)

1. Lessons need to be **engaging to students, motivating them to learn**. Learner motivation and cognitive engagement are central to the learning experience.
2. **Mutual respect between teachers and learners**, and for a communal atmosphere and interpersonal relationships which reflect this. Rights of learners need to be respected in the forms of sanction that are used (that is, no corporal punishment or use of humiliation) and in relationships (no exploitation, sexual or otherwise).
3. **What is taught needs to build on learners' existing knowledge and skills**. Learning challenges are most effective and motivating when they are **developmental but are within appropriate reach of learners**.
4. **Teaching is dialogic**, which has been shown to support learning and to make it visible. High quality classroom talk (not just verbal interaction of any kind) develops both individual agency and engagement, and provides teachers with constant feedback on individual and group progress.
5. **A curriculum of relevance to learners' present and future lives**. Meaningful pattern building requires that learners are able to engage with and apply what is being taught within the context of their private and social worlds.
6. Curriculum and pedagogy which embrace **skills and attitude outcomes as well as the acquisition of knowledge** (particularly knowledge acquired through rote learning). It implies 'learning by doing' and therefore classroom variety is required.
7. **Assessment processes should be meaningful for those being assessed so that their learning is improved by it**. They also need to flow from the principles above, and so should not be purely content-driven or based on rote learning. They should be based on and build on what knowledge, skills and attitudes learners have acquired and be informative and relevant both to teachers and learners.

Data Analysis

Document	Number of statements	LC Criteria met	Frequency	Example statements
Teacher trainee appraisal guide	21	1	4	'are they motivated'; 'are all pupils involved in the lesson?'; 'Is learner level of interest kept high?'; '...include all of them in the lesson?'
		2	1	'does the teacher have a good rapport with the learners, friendly and harmonious?'
		3	3	'is the content appropriate, relevant....to the level of the learners?'; 'add value to the learners'; 'does the teacher.....adjust the tempo accordingly'
		4	1	'does the teacher involve them in.....discussion?'
		5	0	
		6	2	'are learners involved in a range of activities?'; 'has the teacher integrated various techniques to maximise on the learning?'
		7	1	
Teaching practice assessment form	25	1	1	'learner continually motivated'
		2	2	'Interaction friendly, encouraging, approachable'; sensitivity to class needs and class environment'
		3	2	'appropriate layout of work'; 'depth of coverage appropriate to level of class'
		4	0	
		5	1	'usefulness, applications, relevance'
		6	0	
		7	0	
TP assessment evaluation questionnaire	25	1	1	'the learners were actively involved in the lesson conclusion'
		2	2	'learners' responses were positively re-inforced'; 'was sensitive to the needs of the class'
		3	1	'suitable to the class level'
		4	0	
		5	0	
		6	0	
		7	0	
Teaching effectiveness evaluation form	25	1	3	'sets a stimulating learning atmosphere'; involves students actively through questioning, answering, discussions etc); 'delivers content in a motivating manner'
		2	2	'encourages and appreciates student participation'; 'interaction with students (friendly, approachable, caring, tolerant)'

		3	0	
		4	0	
		5	1	'uses relevant examples/illustrations to explain principles and concepts'
		6	0	
		7	0	

Further analysis

In the interrogation of these documents, other relevant features of them came to light. If the view of teaching and learning is not learner-centred then what is it? It seems to be about

1. The expectation that the teacher will follow a set of rules about teaching. (Even if all these are done, the lesson won't necessarily be good).
2. The importance of getting through the content
3. Mastery of subject knowledge

Document	No of statements		Frequency	Examples
Teacher trainee appraisal guide	21 9	1	10	'clear aims stated'; 'all resources assembled'; uses teaching aid'; 'legible handwriting'; 'good questioning technique'; 'audible voice'; eye contact'; 'respectably dressed'; 'cultured language'.
		2	1	'achievable within the time specified';
		3	2	'grasp of lesson content'
Teaching practice assessment form	25 4	1	11	'adherence to scheme of work'; 'written lesson plan correctly'; questioning technique effectively used'; 'proper use of chalk board'; 'punctuality and time management'; 'voice projection'; 'decency dressing and language'; 'assignments given and marks'; 'records kept'
		2	1	'evidence of achievement of objectives'
		3	1	'mastery of content'
TP assessment evaluation questionnaire	25 2	1	15	'schemes of work in prescribed format'; 'followed the stated steps in lesson development'; 'files arranged in prescribed format'; 'used set-induction in the lesson introduction'; 'attractive teaching resources'; 'marked books'; 'gave assignments'; 'maintained records'
		2	0	
		3	0	

Teaching effectiveness evaluation form	25 4	1	7	'uses teaching aids'; 'provides a clear summary of concepts'; 'punctuality'; 'availability for consultations'; 'adequate lecture room preparation'; 'class discipline'.
		2	2	'adequately covers course outline within specific time'; 'depth of subject coverage'
		3	2	'demonstrates mastery of subject matter'; 'subject matter relevance to course'

Appendix 6: sub-codes which emerged from the data

Embodied structures

Curriculum

Ideas about how to assess teaching

Examination papers

Cultural attitudes and social norms

Discursive structures

Ideas about effective student learning

Ideas about effective teaching

Ideas about schools and teachers

Institutional structures

Approach to research

Expectations of staff and by staff

Opportunities for staff

Organisation of teaching

Resources

Appendix 7: The department

Working conditions

Field notes p66

Lecturers are allocated a small office, or a place in a shared office. A few - not all – are provided with a computer by the University. Some have their own laptops which they use for work. All the offices I saw were very full of papers – piles and piles of papers and folders on all the surfaces. Communication is by mobile phone and by paper memo. The phones are highly disruptive. Most people have two and every single conversation that I was involved in was interrupted at some point by a phone call. The memos are all typed and stamped to show that they are official communications. It requires people to visit pigeon holes to collect messages (see TE D interview)

There are no photocopying facilities in the department. PCs have to be made in the library and cost 20KSH a sheet. There are no university email addresses – everyone who has email uses gmail and yahoo. Email is not used a great deal.

Meetings are not always organised in advance. On Tuesday, I arranged to meet P on Thursday, but by the time Thursday came, she had a whole series of meetings which had been added in the last few days.

Poor roads and expensive transport make living conditions difficult. Many lecturers have to travel extensively to supervise teaching practice, often staying away from home.

The University wifi was very poor in 2016 but has improved (see TE P interview).

TE have a considerable amount of clerical work to do (FN; p12a) which interferes with their own work. They also teach very large classes and have to mark the work of those classes (FN, p12a; TE narratives H, D, P, S)

Interview with the Chairman

His greatest challenge is the recruitment of staff given the large student-teacher ratios. The classrooms are not big enough to support large groups, or the installation of projectors.

'Interaction is difficult' (FN; p13). He is not able to recruit enough staff trained to masters level, but also with a teaching qualification (FN2015, p39a)

The curriculum is too full. The students have too many courses to take and there is not time for them to internalise the content.

I asked him about the 2012 Curriculum Framework document setting out the vision for a new curriculum. I asked him what he understood by the statement that there should be a move from knowledge reproduction to knowledge production and the implication of this for his department. He did not understand the question (FN; p13). *'in theory this is what they say'* he went on to explain that the implication of this is that instructional methods need to change. To achieve this he went back to the curriculum – there is a need to review the total curriculum and create more time for interaction.

He wants a more concurrent approach – academic study followed by professional training. Education will become a post-graduate course. In that way, he believes that the people who opt to study Education will be more motivated to become teachers.

I asked about opportunities for CPD in the University. He talked proudly of the pedagogical course run by his dept (but it has not run for 4 years (TE P DETA)).

There are 33 lectures in the dept (although 10 have other roles as well). He had to look this up on a chart. Much time is taken up on Masters and PhD supervision. They also have a responsibility to undertake research. He feels this is required but not supported by the university. Lecturers teach 6-9 units per semester, which works out at about 12 hours per week. He talked about the student evaluations of lecturers and the fact that the university will organise workshops when a skills gap is identified. I heard about several such courses: P and F ran a course on TESSA; P ran a one day WS on TESSA and TP; D ran a course for F on excel; P ran a course for medical lecturers on teaching approaches.

I asked about the impact of 'Vision 2030'. The main point he highlighted was the call for 'national cohesion'. They support this in the department by making sure that the students get pastoral care. There are student welfare organisations that are part of the informal curriculum. I asked him about the call to assess skills. He does not see this as the responsibility of the university (FN; p15a), rather the technical institutes.

The Department does not have a sub-structure with deputies and people taking responsibility for particular tasks. I asked about the development plan – they did not have one (FN 2015).

On TESSA(FN 2015, p39) TESSA is *'not yet very strong'*.....he explained that people who have been inducted have left.

The department have formal meetings. The discussion usually focuses on management and administration issues (eg teaching allocation, nomination of external examiners – Agenda 26th march 2016, pts of information, issues of performance management). (P interview, FN, p27).

However, if colleagues request an agenda item then other things can be discussed (eg TE P DETA). It also has an item on 'conflicts of interest'.

Apart from meetings there is very little collaboration. TE F, H and P all use and are aware of TESSA but they do not communicate about it to other colleagues, except through formal channels. It is not mentioned on the course outlines (Phys and Chem Methods) although it was on the reading list.

The lack of collaboration became evident in the TESSA SS evaluation visit (FN 2015 p46).

Ideas underpinning their work

The title of the department is 'curriculum and instruction'. The fundamental learning point seems to be designing schemes of work and planning lessons. The links between the SoW and the LP forms were checked in great detail by the TP supervisors. (FN2015; p69a)

The document providing a briefing for micro-teaching highlights the departmental approach, based on breaking down teaching into individual skills which are practised in micro-teaching. This document also reveals a deficit view of schools and headteachers. The assessment forms indicate what is seen as important.

Departmental culture

Individuals are autonomous as evidenced by F, P and D. Who you know is very important in terms of getting access to resources.

The department is well administered, but not managed. There is very little sense that things can be changed. Even the Chairman talks as if he has no control over how things are done.

The idea of student evaluation is innovative and many talked about it. But the evidence from F is that this is abused. (FN, p40)

Appendix 8: Analysis of examination papers

Analysis of 3 Examination papers

I analysed two Chemistry and one Physics, teaching methods examinations. One of the Chemistry papers was worth 85 marks and was from 2014. The recent papers were worth 30 marks. This is a result of the increases in class size to make the marking load more manageable.

Methodology

I divided the marks into three categories:

1 – Recall of knowledge. These questions required the student to have learnt off by heart the notes that they have been given in class.

2 – Subject Knowledge. These questions require knowledge of the subject matter and could not have been answered by a person with no background in the subject.

3 – Understanding. These questions require some thought on the part of the student. They would need to understand a concept or think through possible responses and select the best one.

Results

Physics teaching methods (2016)				
Qu No.		Recall of K	SK	Understanding
1	10	10		
2	8	8		
3	6		2	4
4	6	3		3
	30	21	2	7

Recall	70.00%
SK	6.67%
Understanding	23.33%

Chemistry teaching methods (2014)				
1	40	24	8	8
2	15	8	1	6
3	15		9	6
4	15	10		5
	85	42	18	25

Recall	49.4%
SK	21.2%
Understanding	29.4%

Chemistry teaching methods (2016)				
1	11	7		4
2	7		7	
3	6	6		
4	6	6		
	30	19	7	4

Recall 63.3%

SK 23.3%

Understanding 13.3%

Conclusion

- The majority of the marks are for the recall of knowledge. The fewer the marks in the exam, the greater the proportion are for recall.
- In Chemistry there is a greater emphasis on SK. This is consistent with the people setting the exam, who identify strongly as Chemists.
- Most of the questions are closed questions.
- Knowledge about teaching is tested using closed questions and being able to answer many of the questions would not necessarily be an indication of being a good teacher.

Appendix 9: Learner-centred quiz

Indicate whether you think each of these statements about 'learner-centred education' are true (T) or false (F)

1. 'Learner-centred' means that the pupils are in charge
2. 'Learner-centred' means taking account of the needs of all pupils
3. 'Learner-centred' means taking account of what pupils already know
4. If you are teaching in a learner-centred way, you do not need to plan your lessons
5. In a learner-centred lesson there will always be a lot of noise.
6. A learner-centred teacher believes that all children can learn
7. If pupils are working in groups then the lesson must be learner centred
8. Learner-centred approaches are not possible with large classes
9. Good learner-centred lessons require a lot of planning
10. Learner-centred lessons always require a lot of resources
11. Learner-centred means not telling pupils when they are wrong
12. A learner-centred teacher encourages pupils to talk about their ideas